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CATCH-UP ON TOMATO HARVESTORS Page 18

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 105, No. 11 NOV-DEC 1990

MANAGEMENT HEADACHES HAVE eased since Bruce Construction Machinery Company dropped CP&A to concentrate on industrial equipment, says vice president and general manager W. Aubrey Strader.

Dealership Learns Lesson:

Industrial, Ag Don't Mix

By JIM HUDSON

BRUCE CONSTRUCTION Machinery management jumped at the chance to add John Deere agricultural equipment and consumer products to their industrial equipment business in 1985.

They recently corrected that mistake.

"What looked like such a good idea never worked," said W. Aubrey Strader, vice-president and general manager in Asheville, North Carolina.

"When a CP&A dealership came available, we thought we could work it right in with our industrial business. We had the facilities already in place. We could hire more sales people. We felt like we could make some additional money.

"But we really didn't know all the facts. Ag and industrial, we learned, are 2 different businesses," Strader said.

This was not Bruce's first foray into the agricultural markets. The company was a John Deere agricultural dealer from its beginning

(See DON'T, pg. 2)

It's Stat Time Again

By SCOTT NESBITT

STATISTICS. It's a word that can make you cringe.

It's a word that conjures up images of glassy-eyed students fighting sleep in an overheated classroom as they nod off to the drone of an equally-bored teaching assistant.

You see that same kind of glazed-over expression at dealer meetings and training sessions, when the marketing guys roll out their flip charts and overhead projectors and start getting excited about numbers.

EDITOR'S NOTEBOOK

Yet there must be something worthwhile in all those numbers.

For 52 previous years, and once again this year, *Implement & Tractor* rolls out the numbers from government and industry sources, packages them in convenient form, and lets you make your own conclusions about where the market is heading.

We call it the Market Statistics Issue, and we know it drives a portion of our readers to ask "Who cares?"

But the issue carrying all the tables is the most frequently-requested back issue during the course of the typical year, and in some years demand exceeds supply.

The statistics issue is not an unchanging thing, and this 1990 version marks the end of an era for some of this stuff.

Take the table titled "Farm Wheel Tractor Retail Sales by States."

(See NOTEBOOK, pg. 4)

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

NOV-DEC 1990
VOL. 105, NO. 11

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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years — $30. Single copies, $3.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953 $3.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

Who's Who...

A roundup of personnel changes and doings in the farm, industrial and power equipment industry.

Steve Bruggeman has been appointed president of Cat Pumps Corp., Minneapolis. He succeeds his father, William L. Bruggeman, founder and president of the firm, which makes a wide range of industrial pumps. The elder Bruggeman will continue as chief executive officer while his son assumes full administrative, marketing and sales responsibilities.

* * * *

Ted Pederson, an 11-year Kubota Tractor Corp. veteran, becomes director/division manager of KTC's Northern Division.

Mike Fairless, with Kubota since 1980, to district manager for the Southern District of KTC's Central Division.

* * * *

Lloyd Wilson is heading up the newly-opened Minneapolis office of Agra-Placements, Ltd., which had 3 previous offices, in West Des Moines, Iowa, Lincoln, Ill. and Peru, Ind., specializing in recruiting executives for domestic and international agri-businesses and horticultural firms.

* * * *

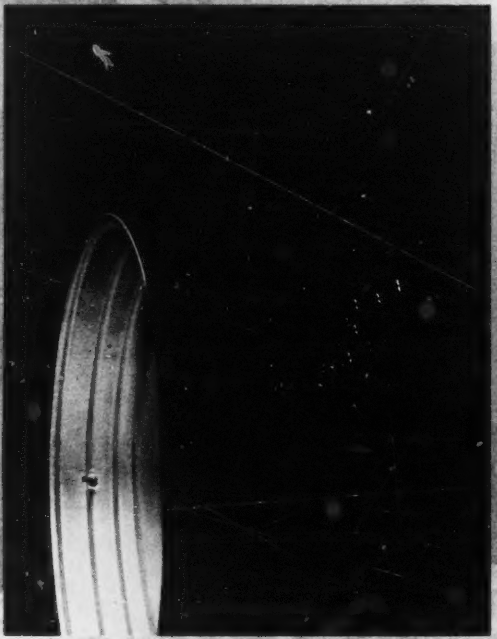
Michael H. Blumenthal has been named executive director of the new Scrap Tire Management Council of the Rubber Manufacturers Association. The Council will develop and promote the use of scrap tires as a valuable resource.

* * * *

Dick Fotsch is named vice president and general manager for the Small Engine Division of Briggs & Stratton Corp., covering all engines B&S makes in Murray, Ky., where he resides, and at Poplar Bluff, Mo., and Milwaukee's Burleigh South

(See WHO'S, pg. 32)

THIS IS THE REASON YOU'LL SWITCH TO RADIALS.



THE NEW HI-TRACTION LUG RADIAL FROM ARMSTRONG.

Compared with bias ply tires, radials have a larger 'footprint' and deeper tread depth. So, for a given size, there's more tread on the ground. Yes, they can cost more, but the extra expense is more than offset by longer tread life and fuel savings.

Still, a lot of farm equipment owners remain unconvinced.

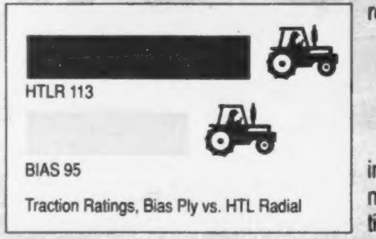
THE CONTROVERSY IS OVER.

Now comes compelling proof of the improved performance of radial tires ... fully implemented for the first time in the new Armstrong Hi-Traction Lug Radial.

Picture a tire with a whopping *18 percent improvement* in traction compared with our bias ply tire. What's more, the HTL Radial delivers a 12 percent improvement in wear even compared with our own agri-tough Super Hi-Power Lug Radial! But compared with our closest competitor...well, frankly, there is no comparison.

WITH SUCH GREAT TRACTION, WHO WOULD EXPECT REDUCED VIBRATION, TOO?

The remarkable thing about the new HTL Radial is that it beats the pants off other radials for reduced tire vibration. Measured against our Super Hi-Power Lug Radial,for example, vehicle testing showed an astonishing *50 to 66 percent* reduction in vibration.



Traction Ratings, Bias Ply vs. HTL Radial

HOW ARMSTRONG'S TIRE DESIGNERS DID IT.

Three of the most important tire performance criteria are traction, vibration, and self-cleaning ability. Ironically as you improve one aspect, trade-offs may occur with the others.

To reduce vibration, for example, Armstrong's tire design team increased the number of lugs on the HTL Radial by about 50 percent. Note in the photo above that the distance between lugs is considerably smaller, so there's a minimum of thumping as the tire rolls from lug to lug.

So far so good. But, with the lugs closer together, special design provisions had to be made to ensure that soil wouldn't clog the space between the lugs. An accomplishment verified by real-life evaluations in various types of soils.

As the HTL Radial's specially curved long bar-medium bar design evolved, it became apparent to the designers that they had achieved a breakthrough -- a tire with greatly reduced vibration that not only doesn't compromise traction, but actually improves on it.

DO WE BELIEVE IN THIS TIRE?

The new HTL Radial is a significant technological achievement. One that will undoubtably set standards in tractor tire design for years to come. But equally important, it follows in the Armstrong tradition of building the most reliable tires on or off the road. Which is why the rugged HTL Radial is covered by an *eight-year standard limited warranty*, the most extensive warranty in the industry. Plus it's covered for five years against field hazards and stubble damage! Nobody protects your tire investment like Armstrong.

ALL THE WAYS YOU'LL SAVE.

- Even greater traction means you'll cover more ground in the same amount of time and save on fuel costs.
- Slower wear-out means longer tire life.
- Reduced vibration means fewer vibration-related equipment problems and improved operator comfort.
- And, Armstrong's eight-year standard limited warranty will save you a lot of sleepless nights, too.

Compared with bias tires, radials offer inherently greater traction because of their larger 'footprint'. The new HTL Radial offers improved traction with substantially reduced vibration.

Visit your Armstrong dealer for a look at the amazing new Hi-Traction Lug Radial. And while you're there, see the complete line of Armstrong rhino-tough tires for farm, truck and passenger cars.

Tell them Tuffy the Rhino sent you.

ARMSTRONG

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Circle (5) on Reply Card

I&T
53RD ANNUAL MARKET STATISTICS

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Commercial and Consumer Lawn & Garden Equipment Quantity and Dollar Value, 1985-1989

(Value in thousands of dollars)

	1989		1988		1987		1986		1985	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Commercial turf & grounds equip. (Including parts & attachments) (TOTAL)	–	**626,517**	–	**595,044**	–	**465,635**	–	**412,836**	–	**376,714**
Commercial mowing equipment (TOTAL)	–	**496,797**	–	**473,509**	–	**390,041**	–	**347,482**	–	**317,566**
Powered nonriding mowers	47,777	54,458	52,359	57,323	44,801	41,207	59,303	44,283	58,455	39,780
Reel mowers, riding & greens	13,266	116,204	11,176	86,887	10,593	71,712	7,004	44,767	15,662	50,709
Riding rotary turf mowers	30,131	157,875	32,466	160,449	31,458	141,644	30,102	123,975	33,105	113,674
Gang mower sections, reel & rotary	38,993	45,251	37,957	42,460	35,913	39,539	34,327	35,208	14,290	17,399
Flail mower units, incl. gang	3,223	8,426	3,327	9,450	3,302	7,038	3,332	7,550	4,578	8,521
Other mowing equipment	10,275	10,797	5,290	5,750	6,446	6,684	8,228	7,377	4,703	5,620
Comm. mower parts & attachments	–	103,786	–	111,190	–	82,217	–	84,322	–	81,863
Other comm. turf & grounds equip.	–	129,720	–	121,535	–	75,594	–	65,354	–	59,148
Tractors, trucks, sod equip., irrig. equip., seeders, spreaders	296,245	64,970	338,466	56,711	12,169	31,602	13,009	33,046	16,609	29,454
Aerators, spikers and pluggers	9,029	17,903	9,976	20,823	7,628	15,649	6,290	9,931	4,971	9,266
Dethatchers	9,820	6,782	10,257	6,197	4,562	2,651	2,561	1,324	3,372	1,681
Power brooms, blowers, vacuums, sweepers	11,637	16,862	14,257	15,542	10,285	13,554	9,630	12,929	5,742	9,634
Non-mowing equip. parts and attachments	–	23,203	–	22,202	–	12,138	–	8,124	–	9,113
Consumer lawn & garden equip. (TOTAL)	–	**3,744,242**	–	**3,936,959**	–	**3,853,665**	–	**3,385,840**	–	**2,995,516**
Consumer nonriding l & g, snow equip.	15,671,980	1,746,793	16,018,765	1,771,012	16,129,251	1,777,291	14,100,587	1,581,431	14,946,154	1,529,044
Mowers, reel, push & powered	28,467	10,675	41,804	17,648	32,537	9,953	73,975	26,305	58,132	19,909
Mowers, rotary, push	3,986,630	536,075	3,852,716	524,698	4,115,380	553,670	3,523,116	481,916	3,567,467	477,102
Mowers, rotary, self-prop. & all electric	1,737,296	412,323	1,961,681	418,579	2,051,026	497,511	1,754,663	374,969	1,671,101	350,324
Rotary tillers, 2-wheel tractors	389,563	150,651	345,232	138,716	318,758	135,298	324,185	144,310	352,810	158,694
Snow throwers, single stage	170,314	45,610	199,829	52,568	359,343	104,288	336,603	75,227	282,386	60,750
Snow throwers, dual stage	107,632	64,226	186,763	107,630	212,852	101,279	201,826	107,829	156,669	82,168
Edgers, trimmers, power, fixed blade	436,640	34,713	507,764	44,474	528,561	46,011	468,642	43,411	582,588	49,842
Edgers, trimmers, power, elec. & other	4,454,917	245,100	4,426,293	221,235	4,411,536	162,625	4,422,903	170,427	3,912,956	155,931
Shredders, shredder-grinders	76,776	29,374	72,330	26,425	59,545	19,567	67,211	26,048	55,770	26,215
Yard vacuums & blowers	1,575,019	97,655	1,393,710	91,147	939,451	56,863	877,004	50,012	1,125,579	56,836
Lawn sweepers (non-attached type)	36,114	5,170	44,821	6,022	52,403	5,935	74,468	8,960		
Other nonriding l & g, snow equip.	2,672,612	115,221	2,985,822	121,870	3,048,129	84,291	1,975,991	72,017	3,180,696	91,273
Consumer riding l & g, snow equip.	1,183,387	1,392,504	1,235,608	1,511,984	1,257,788	1,505,611	1,058,636	1,255,382	1,035,156	1,130,353
Lawn tractors, riders, front engine	817,568	853,542	734,227	765,387	738,679	809,273	621,919	677,300	573,741	556,177
Lawn tractors, riders, rear engine	271,622	275,421	364,047	344,703	399,730	381,223	307,662	266,528	348,422	296,576
Garden tractors and other riding equip	94,197	263,541	137,334	401,894	119,379	315,115	129,055	311,824	112,146	276,105
Nonriding parts & attachments	–	229,533	–	222,851	–	150,907	–	161,779	–	150,044
Riding equip. parts & attachments	–	375,412	–	431,112	–	419,856	–	387,248	–	186,075

SOURCE: U.S. Dept. of Commerce Census Bureau Industrial Report MA35A(89)-1, "Farm Machinery and Garden Equipment," issued October 1990, and previous years' MA35A reports. In some categories, I&T has combined data to save space.

Principal Machines on Farms, by State — 1990

STATE	WHEEL TRACTORS			SELF-PROPELLED COMBINES			CORN HEADS		POWER ELEVATORS	MANURE SPREADERS	CORN & COTTON PLANTERS	GRAIN DRILLS	MOLDBOARD PLOWS	SIDE DELIVER RAKES
	1982 Census Number	1987 Census Number	Estimated July 1, 1990 Number	1982 Census Number	1987 Census Number	Estimated July 1, 1990 Number	1982 Census Number	Estimate July 1, 1990 Number	Estimated July 1, 1990 Number	Estimated July 1, 1990 Number	Estimated July 1, 1990 Number	Estimated July 1, 1990 Number	Estimated July 1, 1990 Number	Estimate July 1, 19 Number
Maine	13,569	14,260	14,750	320	540	540	181	160	4,790	2,795	275	755	7,540	5,185
New Hampshire	5,097	5,052	5,175	8	23	20	50	40	2,260	1,785	250	50	2,575	2,195
Vermont	15,274	15,295	15,415	76	128	125	374	355	7,290	5,635	1,415	280	8,715	6,545
Massachusetts	9,956	13,160	13,520	23	60	60	145	140	3,270	2,035	775	90	5,215	3,120
Rhode Island	1,364	1,556	1,610	6	8	5	13	10	450	235	85	25	605	280
Connecticut	8,421	9,218	9,825	53	84	80	98	75	3,805	2,190	910	70	4,950	2200
New York	119,498	115,509	115,630	6,030	7,887	7,910	3,904	3,950	63,420	36,010	17,435	23,925	69,010	42,480
New Jersey	20,554	23,375	23,680	1,011	1,096	1,100	593	580	5,580	2,155	2,130	2,190	14,380	3,560
Pennsylvania	136,505	142,342	142,530	9,707	13,744	13,780	5,408	5,600	67,560	37,255	30,045	35,910	87,660	43,810
Delaware	8,012	7,128	7,490	1,342	1,280	1,300	1,006	955	3,585	1,580	1,880	1,810	5,530	930
Maryland	36,951	37,672	38,210	3,279	3,579	3,625	2,840	2,770	14,900	7,505	7,665	7,915	24,795	7,970
NORTHEAST	**375,201**	**384,567**	**387,835**	**21,855**	**28,429**	**28,545**	**14,612**	**14,635**	**176,910**	**99,180**	**62,865**	**73,020**	**230,975**	**118,275**
Ohio	193,367	197,852	197,320	33,200	35,908	36,150	26,403	26,200	116,145	50,385	56,875	57,200	140,905	49,855
Indiana	167,563	171,059	171,700	34,646	36,151	36,450	31,391	29,100	115,280	44,555	58,320	46,595	120,330	36,795
Illinois	262,112	263,319	262,845	61,411	60,208	61,010	55,636	53,000	175,520	65,170	85,315	58,760	156,095	47,745
Iowa	305,334	302,392	301,755	57,726	60,004	60,510	57,046	56,400	185,370	88,945	94,875	54,505	185,985	80,700
Missouri	193,758	196,774	195,955	32,957	33,765	34,015	21,834	20,200	82,180	49,995	45,445	47,370	131,100	47,655
CORN BELT	**1,122,134**	**1,131,396**	**1,129,575**	**219,940**	**226,036**	**228,135**	**192,310**	**184,900**	**674,495**	**299,050**	**340,830**	**264,430**	**734,415**	**262,750**
Michigan	146,655	143,734	144,455	21,060	23,587	23,660	13,583	14,300	82,375	32,875	34,490	46,015	113,605	39,100
Wisconsin	243,827	250,979	250,105	19,215	25,315	25,390	11,939	13,250	129,950	75,480	60,815	58,660	145,525	81,755
Minnesota	264,581	265,669	265,775	45,847	51,183	51,490	31,098	31,600	145,550	68,285	73,205	68,015	156,960	79,065
LAKE STATES	**655,063**	**660,382**	**660,335**	**86,122**	**100,085**	**100,540**	**56,620**	**59,150**	**357,875**	**176,640**	**168,510**	**172,690**	**416,090**	**199,920**
North Dakota	108,103	111,746	111,705	27,546	30,502	30,700	2,708	3,030	70,535	18,580	13,640	53,835	57,570	20,620
South Dakota	105,699	106,997	106,910	16,961	19,025	19,175	9,606	10,300	62,635	25,960	27,605	30,485	57,765	20,995
Nebraska	164,308	171,501	171,195	34,032	35,024	35,125	25,484	25,240	97,070	39,780	41,215	39,075	81,985	31,895
Kansas	149,870	150,647	151,320	46,662	43,801	44,120	8,321	7,250	103,560	33,165	19,985	63,480	83,235	32,755
GREAT PLAINS	**527,980**	**540,891**	**541,130**	**125,201**	**128,352**	**129,120**	**48,119**	**45,820**	**333,800**	**117,485**	**102,445**	**186,875**	**280,555**	**106,265**
West Virginia	27,110	27,690	27,840	562	874	875	471	480	6,245	7,515	4,750	3,325	17,155	8,740
Kentucky	163,176	167,810	169,565	11,466	12,572	12,630	9,924	10,250	24,110	24,795	34,975	10,275	97,465	28,335
Tennessee	126,365	126,678	127,055	11,227	10,260	10,290	6,508	6,680	14,865	18,090	47,265	12,830	63,245	22,580
Virginia	88,511	84,991	84,760	6,224	6,993	7,030	5,061	5,130	18,360	19,355	23,535	15,475	58,725	21,525
North Carolina	131,488	121,125	121,530	13,820	13,617	13,660	10,618	10,200	20,120	18,945	66,385	20,745	56,420	14,700
APPALACHIAN	**536,650**	**528,294**	**530,750**	**42,299**	**44,316**	**44,485**	**32,582**	**32,740**	**83,700**	**88,700**	**176,910**	**62,650**	**293,010**	**95,880**
South Carolina	44,338	40,783	41,610	6,263	5,077	5,125	3,808	3,600	4,660	3,495	27,815	10,705	9,805	5,430
Georgia	75,505	73,732	73,635	8,980	8,831	8,890	6,438	5,735	13,650	5,930	35,355	9,235	27,875	9,780
Florida	52,346	158,854	62,670	1,742	1,638	1,645	1,307	1,330	3,615	1,065	5,420	1,600	18,070	1,770
Alabama	66,330	66,163	67,580	6,935	5,870	5,880	3,630	3,600	11,200	3,955	38,525	6,490	20,855	7,015
SOUTHEAST	**238,519**	**239,532**	**245,495**	**23,920**	**21,416**	**21,540**	**15,183**	**14,265**	**33,125**	**14,445**	**107,115**	**28,030**	**76,605**	**23,995**
Mississippi	70,139	62,506	63,280	9,695	7,371	7,400	861	950	7,660	4,515	47,845	7,640	26,340	9,000
Louisiana	56,883	53,568	54,405	8,468	6,567	6,625	286	240	2,500	2,600	15,140	6,835	19,705	5,810
Arkansas	81,556	83,111	82,985	12,891	10,831	10,820	221	190	9,355	6,350	19,885	12,200	43,545	9,700
DELTA STATES	**208,578**	**199,185**	**200,670**	**31,054**	**24,769**	**24,845**	**1,368**	**1,380**	**19,515**	**13,465**	**83,870**	**26,675**	**89,590**	**24,510**
Oklahoma	99,934	106,518	106,295	17,299	15,781	15,810	600	500	24,975	8,250	8,405	29,810	72,855	18,445
Texas	264,740	288,018	287,105	21,049	21,260	21,350	3,913	3,875	39,750	15,655	50,535	46,695	83,330	21,425
S. Plains	**364,674**	**394,536**	**393,400**	**38,348**	**37,041**	**37,160**	**4,513**	**4,375**	**64,725**	**23,905**	**58,940**	**76,505**	**156,185**	**39,870**
Montana	54,666	56,648	56,470	12,038	12,025	12,060	89	70	27,780	9,720	1,000	20,165	25,885	12,965
Idaho	50,575	54,534	54,965	9,309	9,495	9,550	344	320	24,250	12,120	2,430	14,660	31,430	15,180
Wyoming	20,673	20,360	20,580	1,991	2,127	2,130	221	230	4,985	4,160	870	3,905	14,755	4,890
Colorado	56,141	59,043	59,440	7,994	8,469	8,510	2,618	2,590	24,975	12,370	5,685	14,565	24,710	13,350
New Mexico	17,455	19,162	19,260	1,346	1,541	1,535	308	320	2,545	2,015	2,890	1,840	8,260	3,940
Arizona	12,262	13,364	14,070	369	382	390	94	90	1,780	855	1,735	1,345	3,170	1,320
Utah	21,613	23,985	24,595	1,591	1,754	1,755	225	220	9,970	6,705	1,550	5,195	14,275	8,770
Nevada	5,160	5,768	5,780	234	294	285	19	20	930	985	60	300	2,400	1,400
MT. STATES	**238,545**	**252,864**	**255,160**	**34,872**	**36,087**	**36,215**	**3,918**	**3,860**	**97,215**	**48,930**	**16,220**	**61,975**	**124,885**	**61,815**
Washington	59,377	63,139	63,580	8,314	7,996	8,020	558	580	21,530	12,760	1,675	16,300	34,900	12,780
Oregon	53,243	55,813	56,050	6,235	6,442	6,470	209	220	17,370	11,285	1,040	11,220	33,920	11,240
California	139,735	153,271	158,175	6,102	6,087	6,130	1,123	1,130	24,005	13,275	8,420	8,435	56,705	12,965
PACIFIC	**252,355**	**272,223**	**277,805**	**20,651**	**20,525**	**20,620**	**1,890**	**1,930**	**62,925**	**37,320**	**11,135**	**35,955**	**125,525**	**36,985**
TOTAL	**4,519,699**	**4,603,870**	**4,622,155**	**644,262**	**667,056**	**671,205**	**369,115**	**363,055**	**1,904,285**	**919,120**	**1,128,840**	**788,805**	**2,527,835**	**970,265**

*Not reported separately. [1]Cutter bar type only. [2]Shear-bar type. [3]Does not include windrowers with conditioning rolls. [4]Includes engines used for stationary work and number of power units not elsewhere classified.

Source: U.S. Department of Commerce Census Bureau Census of Agriculture, 1987 and 1982. Estimates based on interpretation of data from that census, Census Bureau Current Industrial Reports, and various industry and private data sources.

U.S. Farm Wheel Tractor Retail Sales, 1985-1989

2-Wheel Drive	1985	1986	1987	1988	1989
Under 40 hp	57,214	61,648	59,902	54,741	46,926
40 & Under 100 hp	37,847	30,848	30,718	33,160	34,910
100 & Under 140 hp	7,300	5,149	5,089	4,320	5,214
140 hp & Over	10,400	9,113	10,822	11,802	15,369
Total 2-Wheel Drive	**112,761**	**106,758**	**106,531**	**104,023**	**102,419**
4-Wheel Drive					
Under 200 hp	1,087	595	602	998	1,125
200 hp & Over	1,825	1,442	1,051	1,731	3,026
Total 4-Wheel Drive	**2,912**	**2,037**	**1,653**	**2,729**	**4,151**
TOTAL Farm Wheel Tractors	**115,673**	**108,795**	**108,184**	**106,752**	**106,570**

SOURCE: Equipment Manufacturers Institute (formerly Farm & Industrial Equipment Institute).

POWER TRACTOR MOWERS*	PICK-UP BALERS			FIELD FORAGE HARVESTERS[1]		MOWER CONDITIONERS[2]			MOTOR TRUCKS			INTERNAL COMBUSTION ENGINES[1]	CHAIN SAWS	
Estimated July 1, 1990 Number	1982 Census Number	1987 Census Number	Estimated July 1, 1990 Number	1982 Census Number	Estimated July 1, 1990 Number	1982 Census Number	1987 Census Number	Estimated July 1, 1990 Number	1982 Census Thousands	1987 Census Thousands	Estimated July 1, 1990 Thousands	Estimated July 1, 1990 Number	Estimated July 1, 1990 Number	
5,810	3,047	2,925	2,920	1,181	1,220	2,353	2,326	2,330	12.2	12.2	12.1	1,220	7,115	Maine
2,655	1,259	1,207	1,210	544	560	960	963	975	4.1	3.9	3.8	1,140	2,350	New Hampshire
7,895	4,167	3,882	3890	2,569	2,735	3,866	3,706	3,730	7.5	7.3	7.2	1,585	5,915	Vermont
3,485	1,704	1,993	2,005	1,083	1,105	1,533	1,783	1,795	9.4	11.0	11.1	1,640	4,310	Massachusetts
280	205	196	195	93	95	146	245	245	1.3	1.3	1.3	165	595	Rhode Island
3,055	1,508	1,595	1,600	773	805	1,318	1,506	1,530	6.8	6.9	6.8	1,435	3,615	Connecticut
48,575	28,078	26,136	26,190	19,040	19,560	25,603	25,229	25,610	60.5	56.7	56.8	19,190	47,795	New York
4,015	2,260	2,467	2,480	1,165	1,180	2,386	2,641	2,655	15.2	16.1	16.2	2,115	5,685	New Jersey
53,855	37,257	37,180	37,280	18,078	18,430	29,456	32,352	32,675	66.1	67.1	67.2	18,255	41,880	Pennsylvania
930	531	492	500	249	255	519	474	475	6.2	6.0	6.0	850	2,410	Delaware
9,970	5,719	6,126	6,150	2,670	2,730	5,136	5,638	5,720	25.9	24.3	24.4	4,130	11,665	Maryland
140,525	**85,735**	**84,199**	**84,420**	**47,465**	**48,675**	**73,276**	**76,863**	**77,740**	**215.2**	**212.8**	**212.9**	**51,725**	**133,335**	**NORTHEAST**
56,940	39,754	38,910	38,820	11,090	11,270	26,143	29,717	29,950	107.8	103.9	103.8	17,500	58,035	Ohio
44,520	23,947	25,191	25,270	6,917	6,990	15,583	18,613	18,830	112.2	111.2	111.3	18,080	62,070	Indiana
62,695	30,463	30,000	29,940	9,972	10,080	21,867	23,144	23,350	150.6	144.3	144.5	26,905	67,500	Illinois
94,610	47,776	46,867	46,950	17,638	18,100	28,401	31,333	31,710	147.7	143.4	143.5	28,645	53,650	Iowa
76,440	48,662	48,649	48,740	8,055	8,110	26,527	28,982	29,410	159.7	160.1	160.2	29,580	89,880	Missouri
335,205	**190,602**	**189,617**	**189,720**	**53,672**	**54,550**	**118,521**	**131,789**	**133,250**	**678.0**	**662.9**	**663.3**	**120,710**	**331,135**	**CORN BELT**
42,260	25,051	24,924	24,910	11,809	12,050	21,055	21,051	21,140	80.3	77.2	77.2	16,275	43,425	Michigan
91,405	58,042	56,739	56,870	43,880	44,810	51,630	52,292	52,860	99.5	97.2	97.1	31,185	88,135	Wisconsin
85,080	51,038	49,402	49,500	23,803	24,225	32,050	34,770	35,050	143.8	138.8	139.0	42,325	63,020	Minnesota
218,745	**134,131**	**131,065**	**131,280**	**79,492**	**81,085**	**104,735**	**108,113**	**109,050**	**323.6**	**313.2**	**313.3**	**89,785**	**194,580**	**LAKE STATES**
35,955	16,628	17,690	17,700	4,839	4,925	6,181	7,611	7,690	101.1	106.3	106.4	31,895	4,070	North Dakota
41,990	17,966	18,928	18,960	10,568	10,775	6,958	7,980	8,060	68.0	73.9	74.0	21,155	3,135	South Dakota
48,570	18,906	19,603	19,630	12,538	12,690	15,497	16,767	16,910	118.9	127.2	127.3	28,930	13,400	Nebraska
47,125	31,998	31,892	31,850	9,367	9,435	18,932	20,167	20,310	159.4	159.3	159.4	37,290	22,105	Kansas
173,640	**85,498**	**88,113**	**88,140**	**37,312**	**37,825**	**47,568**	**52,525**	**52,970**	**447.4**	**466.7**	**467.1**	**119,270**	**42,710**	**GREAT PLAINS**
16,565	10,550	11,233	11,260	2,323	2,350	6,033	6,548	6,590	20.5	19.7	19.6	4,530	20,695	West Virginia
44,620	35,143	38,418	38,520	7,910	8,080	23,805	28,233	28,580	125.2	122.4	122.5	14,565	42,455	Kentucky
47,820	26,506	29,438	29,520	6,313	6,380	18,734	22,007	22,250	104.7	101.1	101.2	11,225	56,285	Tennessee
29,180	21,805	23,152	23,220	6,209	6,425	14,659	16,094	16,240	68.0	63.8	63.7	10,860	46,055	Virginia
29,655	12,752	13,954	14,010	3,502	3,560	10,888	11,965	12,080	103.3	94.2	94.1	14,135	82,930	North Carolina
167,840	**106,756**	**116,195**	**116,510**	**26,257**	**26,795**	**74,119**	**84,847**	**85,740**	**421.7**	**401.2**	**401.1**	**55,315**	**248,420**	**APPALACHIAN**
9,125	4,823	5,301	5,340	1,260	1,285	4,033	4,500	4,540	34.6	31.8	31.9	5,565	23,425	South Carolina
15,205	10,407	11,175	11,215	2,717	2,740	9,465	11,111	11,160	72.6	68.6	68.7	11,475	32,310	Georgia
3,475	3,754	3,742	3,745	861	875	7,591	7,736	7,760	51.2	51.6	51.7	10,955	7,400	Florida
14,875	11,322	13,346	13,380	2,112	2,125	8,212	10,780	10,800	67.4	65.8	65.7	9,330	30,510	Alabama
42,680	**30,306**	**33,564**	**33,680**	**6,950**	**7,025**	**29,301**	**34,127**	**34,260**	**225.8**	**217.8**	**218.0**	**37,325**	**93,645**	**SOUTHEAST**
19,680	10,509	10,222	10,215	1,927	1,940	7,949	8,029	8,040	59.0	50.6	50.7	8,985	36,020	Mississippi
9,930	6,425	6,725	6,740	1,327	1,340	6,698	6,723	6,740	44.3	39.7	39.6	10,695	19,760	Louisiana
19,015	13,994	15,596	15,650	1,634	1,635	10,035	11,436	11,495	79.3	79.4	79.4	12,120	30,355	Arkansas
48,625	**30,928**	**32,543**	**32,605**	**4,888**	**4,915**	**24,682**	**26,188**	**26,275**	**182.6**	**169.7**	**169.7**	**31,800**	**86,135**	**DELTA STATES**
29,750	22,690	24,820	25,000	2,491	2,500	17,107	18,194	18,320	122.8	126.3	126.3	18,160	9,785	Oklahoma
43,210	33,736	41,208	41,360	5,109	5,175	39,629	47,054	47,390	249.9	267.8	267.9	54,205	19,125	Texas
72,960	**56,426**	**66,028**	**66,360**	**7,600**	**7,675**	**56,736**	**65,248**	**65,710**	**372.7**	**394.1**	**394.2**	**72,365**	**28,910**	**S. PLAINS**
19,640	12,468	13,482	13,530	2,429	2,450	8,102	9,429	9,460	68.2	72.6	72.7	16,535	11,655	Montana
19,580	12,210	12,101	12,025	2,384	2,410	8,515	9,093	9,115	57.1	59.1	59.1	13,535	13,010	Idaho
5,630	5,066	5,181	5,195	1,222	1,230	3,904	4,207	4,220	22.1	23.1	23.2	5,355	3,155	Wyoming
14,440	10,365	11,240	11,320	3,503	3,525	7,040	8,668	8,700	63.0	68.1	68.1	17,395	6,075	Colorado
4,320	3,403	3,280	3,300	802	815	2,395	2,711	2,720	24.6	27.2	27.2	6,505	2,965	New Mexico
1,860	1,042	1,138	1,145	348	360	861	1,032	1,035	16.6	16.6	16.5	4,450	505	Arizona
9,925	6,965	7,076	7,130	1,978	2,045	5,547	6,031	6,050	23.3	25.7	25.8	5,645	2,330	Utah
1,430	1,598	1,791	1,800	437	450	1,314	1,384	1,390	6.5	7.3	7.2	1,320	590	Nevada
76,825	**53,117**	**55,289**	**55,445**	**13,103**	**13,285**	**37,678**	**42,555**	**42,690**	**281.4**	**299.7**	**299.8**	**70,740**	**40,285**	**MT. STATES**
19,015	9,518	9,782	9,850	3,060	3,120	9,838	9,930	9,960	69.2	69.7	69.8	14,135	22,430	Washington
17,890	9,730	9,565	9,560	2,555	2,595	8,528	9,215	9,240	61.2	61.3	61.4	18,330	25,465	Oregon
21,655	6,725	6,697	6,715	2,715	2,810	9,299	10,570	10,580	147.9	157.6	157.6	54,920	31,515	California
58,560	**25,973**	**26,044**	**26,125**	**8,330**	**8,525**	**27,665**	**29,715**	**29,780**	**278.3**	**288.6**	**288.8**	**87,385**	**79,410**	**PACIFIC**
1,335,605	**799,472**	**822,657**	**824,285**	**285,069**	**290,355**	**594,281**	**651,970**	**657,465**	**3,426.7**	**3,426.7**	**3,428.2**	**736,420**	**1,278,565**	**TOTAL**

Canadian Farm Wheel Tractor Retail Sales, 1985-1989

2-Wheel Drive	1985	1986	1987	1988	1989
Under 40 hp	3,964	4,307	4,680	4,207	3,940
40-99 hp	8,480	9,382	9,021	9,344	7,881
100 hp & Over	4,856	3,451	3,065	2,333	2,953
Total 2-Wheel Drive	**17,300**	**17,140**	**16,766**	**15,884**	**14,774**
Total 4-Wheel Drive	**2,525**	**1,609**	**984**	**1,337**	**1,454**
TOTAL Farm Wheel Tractors	**19,825**	**18,749**	**17,750**	**17,221**	**16,228**

SOURCE: Canadian Farm & Industrial Equipment Institute.

Motor Vehicles and Specified Machines on U.S. Farms and Average Prices of Wheel Tractors, January 1, Designated Years

YEAR	TRACTORS (exclusive of steam & garden)[1] Thousands	MOTOR TRUCKS Thousands	GRAIN COMBINES Thousands	CORN PICKERS and PICKER SHELLERS Thousands	PICK-UP BALERS Thousands	FIELD FORAGE HARVESTERS Thousands	GARDEN TRACTORS and MOTOR TILLERS[2] Thousands	WHEEL TRACTORS WHOLESALE PRICES[3] Per Unit Dollars	WHEEL TRACTORS WHOLESALE PRICES[3] Horsepower Dollars
1965	4,787	3,030	910	690	751	316	699	$ 3,541	$ 56
1970	4,619	2,978	790	635	708	304	805	$ 5,560	$ 76
1980	4,598	3,367	653	592	759	293	933	$18,139	$166
1981	4,573	3,385	650	587	774	291	938	$23,308	$199
1982	4,547	3,405	647	582	788	288	942	$25,941	$204
1983	4,520	3,427	644	576	799	285	944	$34,198	$237
1984	4,551	3,428	651	572	804	291	946	$37,434	$261
1985	4,564	3,428	658	568	810	295	947	$40,730	$290
1986	4,577	3,429	660	560	815	299	948	—	—
1987	4,590	3,427	663	554	819	298	949	—	—
1988	4,604	3,427	667	550	823	296	950	—	—
1989	4,613	3,426	668	548	825	294	952	—	—
1990	4,621	3,427	670	547	825	291	951	—	—

SOURCE: Various reports of the U.S. Department of Agriculture and the U.S. Department of Commerce Census Bureau. On-farm data after 1970, except 1975 and 1979, are estimated by I&T.
[1] Consists of wheel and crawler tractors. [2] Motor tillers included after 1964. [3] Estimated at wholesale level by dividing Value of Manufacturers' Shipments by Units Shipped and by Maximum Belt Horsepower data as published in U.S. Department of Commerce Census Bureau Current Industrial Reports in the MA35A series; data not available after 1985.
Note: Data from 1978 Census (Jan. 1, 1979 above) and later years reflect changes in sample coverage and are not fully compatible with earlier years.

Farm Wheel Tractor Retail Sales By State, 1985-1989

Units

	1985			1986			1987			1988			1989		
State	2-wheel Drive	4-wheel Drive	Total Tractors	2-wheel Drive	4-wheel Drive	Total Tractors	2-wheel Drive	4-wheel Drive	Total Tractors	2-wheel Drive	4-wheel Drive	Total Tractors	2-wheel Drive	4-wheel Drive	Total Tractors
Alabama	2,872	2	2,874	3,041	—	3,041	2,943	1	2,944	2,959	2	2,961	4	2,874	2,878
Alaska	39	—	39	22	—	22	20	—	20	12	—	12	—	18	18
Arizona	1,240	29	1,269	657	16	673	638	2	640	677	8	685	20	805	825
Arkansas	3,683	70	3,753	3,154	55	3,209	3,083	31	3,114	3,145	105	3,250	178	3,442	3,620
California	4,931	74	5,005	5,138	73	5,211	4,970	49	5,019	5,963	87	6,050	235	5,971	6,207
Colorado	983	89	1,072	711	50	761	682	59	741	750	98	848	109	795	904
Connecticut	715	1	716	937	—	937	1,091	1	1,092	1,065	—	1,065	—	674	674
Delaware	286	7	293	351	6	357	320	4	324	369	12	381	17	409	426
Florida	4,543	30	4,573	4,732	31	4,763	4,375	55	4,430	4,615	68	4,683	98	4,235	4,333
Georgia	5,242	5	5,247	5,077	6	5,083	5,173	3	5,176	4,644	5	4,649	11	4,491	4,502
Hawaii	126	9	135	142	4	146	149	4	153	194	2	196	4	206	210
Idaho	786	83	869	483	35	518	497	17	514	490	23	513	71	805	876
Illinois	3,327	252	3,579	3,182	155	3,337	3,204	116	3,320	3,070	173	3,243	322	3,364	3,686
Indiana	2,789	113	2,902	2,784	68	2,852	2,712	46	2,758	2,348	100	2,448	195	2,694	2,889
Iowa	1,894	68	1,962	2,022	69	2,091	2,433	64	2,497	2,516	111	2,627	161	2,489	2,650
Kansas	1,739	248	1,987	1,585	134	1,719	1,591	132	1,723	1,778	268	2,046	293	1,767	2,060
Kentucky	3,044	23	3,067	2,643	11	2,654	2,519	8	2,527	2,506	14	2,520	34	2,923	2,957
Louisiana	3,419	66	3,485	2,602	15	2,617	2,430	23	2,453	2,212	66	2,278	79	2,297	2,375
Maine	625	—	625	806	—	806	824	—	824	903	—	903	1	695	696
Maryland	2,139	3	2,142	2,081	1	2,082	2,279	2	2,281	2,022	3	2,025	8	1,869	1,877
Massachusetts	783	—	783	999	—	999	1,188	—	1,188	1,043	2	1,045	—	650	650
Michigan	2,975	74	3,049	3,051	51	3,102	2,624	34	2,658	2,782	56	2,838	104	2,713	2,817
Minnesota	1,714	202	1,916	1,651	183	1,834	1,816	153	1,969	1,777	227	2,004	311	1,965	2,276
Mississippi	3,172	20	3,192	2,516	7	2,523	2,317	16	2,333	2,351	21	2,372	31	2,471	2,502
Missouri	3,159	35	3,194	3,290	38	3,328	3,266	43	3,309	3,268	97	3,365	119	3,056	3,175
Montana	602	122	724	323	103	476	340	76	416	347	79	426	147	443	590
Nebraska	963	63	1,026	1,258	66	1,324	1,314	64	1,378	1,585	90	1,675	146	1,614	1,760
Nevada	113	4	117	102	2	104	99	1	100	87	1	88	3	111	114
New Hampshire	946	—	946	1,139	—	1,139	1,293	—	1,293	1,117	1	1,118	1	725	726
New Jersey	1,062	1	1,063	1,275	—	1,275	1,337	—	1,337	1,395	1	1,396	4	1,068	1,072
New Mexico	529	18	547	418	9	427	444	5	449	456	6	462	9	455	464
New York	3,717	21	3,738	4,065	24	4,089	4,074	6	4,080	3,937	16	3,953	37	3,410	3,447
North Carolina	4,478	9	4,487	4,511	7	4,518	5,334	3	5,337	5,218	4	5,222	27	4,955	4,982
North Dakota	917	351	1,268	892	292	1,184	1,092	223	1,315	623	285	908	397	805	1,202
Ohio	4,537	56	4,593	4,364	67	4,431	4,276	25	4,301	3,758	33	3,791	85	3,783	3,868
Oklahoma	2,203	167	2,370	1,899	82	1,981	1,857	81	1,938	1,729	164	1,893	208	1,682	1,890
Oregon	1,606	36	1,642	1,699	24	1,723	1,579	11	1,590	1,612	28	1,640	60	1,720	1,780
Pennsylvania	4,095	16	4,111	4,524	15	4,539	4,640	9	4,649	4,462	11	4,473	18	4,007	4,025
Rhode Island	97	—	97	117	—	117	119	—	119	115	—	115	—	83	83
South Carolina	2,171	5	2,176	2,033	1	2,034	2,127	2	2,129	2,646	5	2,651	8	2,465	2,473
South Dakota	809	158	967	934	149	1,083	1,130	118	1,248	837	179	1,016	223	1,023	1,246
Tennessee	4,522	16	4,538	4,207	13	4,220	4,472	6	4,478	4,015	15	4,030	34	3,814	3,848
Texas	13,252	192	13,444	9,849	77	9,926	8,183	95	8,278	6,839	150	6,989	146	6,718	6,864
Utah	625	6	631	480	4	484	308	1	309	283	5	288	8	342	350
Vermont	600	2	602	625	—	625	639	—	639	612	—	612	1	580	581
Virginia	3,253	5	3,258	3,309	6	3,315	3,704	1	3,705	3,722	2	3,724	3	3,579	3,582
Washington	1,652	83	1,735	1,450	39	1,489	1,433	30	1,463	1,325	53	1,378	87	1,672	1,714
West Virginia	685	—	685	925	1	926	850	—	850	685	—	685	1	631	632
Wisconsin	2,615	60	2,675	2,225	41	2,266	1,900	23	1,923	1,844	40	1,884	59	2,373	2,432
Wyoming	168	18	186	149	7	156	131	8	139	105	12	117	25	165	190
U.S. Govt.	13	—	13	29	—	29	183	2	185	368	1	369	1	54	55
Miscellaneous	306	—	306	250	—	250	529	—	529	835	—	835	5	509	515
TOTAL	**112,761**	**2,912**	**115,673**	**106,758**	**2,037**	**108,795**	**106,531**	**1,653**	**108,184**	**104,017**	**2,729**	**106,746**	**4,151**	**102,419**	**106,570**

Source: Equipment Manufacturers Institute (formerly Farm & Industrial Equipment Institute). Figures do not include garden tractors, motor tillers or contractors' off-highway equipment.

Retail Sales, By State, of Selected Farm Equipment, Jan.-Dec., 1987-1989[1]

(In Units)

STATE	COMBINES SELF-PROPELLED			HAY BALERS[2]			WINDROWERS SELF-PROPELLED						GRINDER-MIXERS			SHEAR-BAR FORAGE HARVESTERS[3]			MOWER CONDI-TIONERS ALL-TYPES		
							POWER UNITS			TOTAL HEADS											
	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989
Alabama	10	15	16	89	86	80	—	—	1	—	—	1	28	27	28	9	2	3	80	106	72
Alaska	—	—	—	2	2	—	—	1	—	—	1	—	1	1	—	—	1	—	3	—	4
Arizona	4	2	8	23	11	16	32	30	37	33	30	41	—	—	1	5	1	7	2	3	1
Arkansas	244	250	396	68	103	124	—	3	6	—	3	6	5	15	12	4	—	1	140	146	167
California	41	47	86	65	67	70	128	195	199	142	224	220	2	—	3	34	26	34	29	25	18
Colorado	81	83	94	138	164	206	57	64	77	62	74	106	11	8	12	5	20	10	84	100	86
Connecticut	—	—	—	19	37	22	—	—	—	—	—		1	—	—	17	18	12	53	61	40
Delaware	8	17	41	16	13	14	—	1	—	—	1	—	2	3	4	3	6	5	16	16	23
Florida	3	5	16	42	54	55	1	—	1	1	—	1	3	5	4	6	4	20	25	28	60
Georgia	47	73	114	135	122	95	—	1	—	—	1	—	26	31	39	19	12	14	98	100	101
Hawaii	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Idaho	70	43	106	130	175	251	85	84	88	89	94	127	2	4	2	11	16	22	41	54	68
Illinois	940	653	1,164	117	148	174	4	3	5	6	4	5	209	210	191	61	76	61	364	390	462
Indiana	542	397	631	139	149	174	1	7	10	1	8	11	182	174	138	45	15	56	343	294	453
Iowa	881	833	1,030	102	157	211	28	12	20	30	15	29	553	595	480	72	94	98	518	571	666
Kansas	467	457	622	103	111	160	66	99	100	71	105	130	46	65	62	27	29	55	247	256	318
Kentucky	66	73	130	168	149	196	2	—	—	2	—	—	60	90	76	48	43	47	529	573	721
Louisiana	35	77	130	38	53	49	—	—	—	—	—	—	4	6	6	5	—	4	45	20	20
Maine	—	—	4	35	27	29	—	—	—	—	—	—	—	—	—	19	14	20	120	107	93
Maryland	30	42	91	73	81	63	7	10	9	7	10	11	13	11	11	34	24	31	108	136	136
Massachusetts	—	—	—	25	28	37	—	—	—	—	—	—	—	2	—	10	17	9	65	52	39
Michigan	129	81	144	125	142	222	9	13	18	8	14	26	83	60	68	100	104	130	353	346	418
Minnesota	457	374	581	233	314	451	50	54	57	57	53	71	175	222	211	174	181	228	510	585	770
Mississippi	78	89	180	44	44	39	—	—	—	—	—	—	11	10	4	7	7	4	43	54	33
Missouri	391	306	451	179	225	272	4	5	3	5	4	4	88	133	133	20	26	31	565	634	852
Montana	140	59	130	90	82	113	88	92	110	113	117	180	7	18	15	19	16	19	64	79	82
Nebraska	591	597	643	52	62	75	83	66	90	95	86	113	121	174	150	56	78	73	240	303	315
Nevada	—	—	—	17	12	22	14	22	35	19	24	39	—	—	—	7	1	6	13	13	8
New Hampshire	—	—	—	43	46	31	—	—	—	—	—	—	1	—	—	12	11	8	102	103	81
New Jersey	4	8	10	21	24	28	—	—	2	—	—	3	6	3	1	7	6	8	38	37	33
New Mexico	3	4	5	65	88	100	35	22	22	34	24	25	2	—	—	3	3	9	22	17	15
New York	32	30	42	267	296	377	17	13	27	17	15	31	23	32	30	256	256	299	725	718	866
North Carolina	93	120	153	177	157	140	—	1	1	1	1	1	21	27	20	32	23	35	287	258	254
North Dakota	444	157	383	6	11	15	72	42	68	86	50	107	55	59	59	35	43	49	141	116	174
Ohio	418	237	349	239	217	305	10	4	2	10	2	5	179	145	122	88	101	88	590	476	602
Oklahoma	61	66	101	128	161	201	34	31	32	35	38	46	16	19	22	3	2	5	196	219	267
Oregon	77	66	71	125	126	169	129	122	145	167	152	190	3	4	1	22	23	17	104	120	72
Pennsylvania	54	54	85	389	375	401	23	39	34	23	40	36	120	83	104	182	170	195	776	723	768
Rhode Island	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
South Carolina	36	65	110	66	50	67	—	1	1	—	1	1	14	21	14	8	5	14	79	80	61
South Dakota	270	175	299	26	36	61	77	79	106	108	90	146	92	140	144	74	134	138	130	159	179
Tennessee	45	65	98	182	187	169	—	1	2	—	1	2	59	57	65	19	23	46	402	430	492
Texas	152	150	253	280	281	480	20	18	36	21	20	43	55	54	62	16	8	17	490	485	698
Utah	7	3	6	129	145	148	30	52	35	36	57	50	8	7	9	21	32	28	84	81	87
Vermont	1	—	—	49	34	39	3	3	3	4	2	3	—	—	1	61	67	55	219	163	181
Virginia	24	33	76	146	129	112	3	1	2	3	2	1	25	21	26	48	52	48	515	437	500
Washington	67	111	91	106	179	142	62	81	86	76	94	108	1	1	2	23	28	43	81	84	101
West Virginia	1	—	—	81	59	72	—	—	—	—	—	—	11	9	6	12	10	11	124	86	127
Wisconsin	122	73	164	496	458	808	82	98	130	89	97	139	151	107	144	528	530	685	1,399	1,166	1,543
Wyoming	6	5	6	58	58	58	46	50	46	50	59	72	3	3	3	3	1	2	28	23	25
U.S. Govt.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous[4]	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	10	—
TOTAL	**7,172**	**5,995**	**9,110**	**5,352**	**5,735**	**7,123**	**1,287**	**1,420**	**1,646**	**1,501**	**1,611**	**2,130**	**2,478**	**2,656**	**2,485**	**2,280**	**2,405**	**2,801**	**11,239**	**11,043**	**13,152**

SOURCE: Equipment Manufacturers Institute (formerly Farm & Industrial Equipment Institute).

NOTES: [1] Includes revisions for prior months. [2] For making bales of under 200 lbs. [3] Pull-type, mounted or self-propelled. [4] Sales reported as miscellaneous retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels, such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Dollar Value of Farm Equipment Imports by Country of Origin, Jan., 1985-June, 1990

(In Thousands)

Country	Jan.-Dec. 1985	Jan.-Dec. 1986	Jan.-Dec. 1987	Jan.-Dec. 1988	Jan.-Dec. 1989	Jan.-Dec. 1990
Canada	$415,527	$366,074	$497,337	$575,949	$554,118	$275,583
Mexico	8,159	6,218	11,419	37,008	32,041	15,376
Brazil	12,214	10,967	18,877	27,632	29,732	12,684
Sweden	3,464	4,538	4,731	4,805	4,554	2,995
Denmark	9,331	7,290	9,676	13,106	9,055	10,591
Netherlands	33,945	29,778	31,513	33,422	28,841	24,547
United Kingdom	207,020	234,406	256,182	366,337	378,660	184,765
Belgium	29,389	42,537	46,125	64,028	67,283	61,926
France	68,681	64,556	64,776	118,789	118,590	76,364
West Germany	222,756	252,740	244,560	289,718	326,937	263,478
Austria	2,540	3,455	4,480	6,279	3,566	9,710
Yugoslavia	205	1,251	7,766	8,968	5,343	2,338
Hungary	5,444	1,816	5,917	5,620	13,136	5,851
Czechoslovakia	5,926	6,197	3,759	6,849	7,085	6,354
Romania	4,409	1,921	5,326	5,710	5,208	2,816
Italy	122,300	118,808	128,651	154,915	158,473	91,587
Spain	3,996	5,978	6,254	7,436	9,198	3,135
Israel	7,619	7,475	8,629	9,171	9,274	4,931
New Zealand	10,725	8,123	11,012	12,903	6,375	3,141
Australia	5,421	5,941	7,159	8,429	9,548	2,507
Japan	355,577	418,780	420,852	388,774	370,349	186,902
China (Taiwan)	5,132	6,066	7,297	8,322	9,501	4,387
China (P.R.C.)	2,568	3,002	5,408	6,345	4,302	2,728
Korea	1,256	5,667	7,456	19,842	29,136	18,811
Soviet Union	1,266	3,731	5,394	9,599	12,127	11,062
TOTAL	**$1,557,623**	**$1,630,628**	**$1,834,925**	**$2,206,957**	**$2,229,902**	**$1,309,076**

Source: U.S. Department of Commerce, International Trade Administration, Office of Capital Goods and International Construction.

Imports of Farm Equipment by Product, 1986-1990

	Jan.-Dec. 1986		Jan.-Dec. 1987		Jan.-Dec. 1988		Jan.-Dec. 1989		Jan.-June 1990	
Product	**Quantity**	**Value in Thousands of Dollars**	**Quantity**	**Value in Thousands of Dollars**	**Quantity**	**Value in Thousands of Dollars**	**Quantity**	**Value in Thousands of Dollars**	**Quantity**	**Value in Thousands of Dollars**
Knives & Cutting Blades	8,741,126	$ 8,202	9,628,822	$ 10,497	8,293,169	$ 10,156	9,269,758	$ 12,943	7,074,490	$ 17,586
Plows & Listers	3,363	7,962	5,532	11,246	2,482	8,429	8,484	18,059	3,691	9,841
Cultivators & Weeders	32,017	25,127	52,430	30,088	56,922	32,044	31,449	51,788	29,217	30,270
Parts of Plows, Cultivators, Weeders & Listers	—	23,536	—	30,362	—	41,256	—	29,713	—	13,033
Harrows, Rollers, Stalk Cutters, Soil Pulverizers	32,442	16,987	23,565	24,614	33,147	27,020	39,455	9,543	12,181	5,954
Parts of Harrows, Rollers, Stalk Cutters, etc	—	12,157	—	24,224	—	31,567	—	64,311	—	33,411
Planting, Seeding & Fertilizing Machinery	30,288	24,074	34,137	31,550	44,900	28,168	75,907	42,547	67,189	31,404
Parts of Planting, Seeding & Fertilizing Machinery	—	9,858	—	11,107	—	11,130	—	16,390	—	9,125
Haying Machinery other than Mowers	5,347	10,588	7,650	8,002	8,217	10,561	10,604	10,671	9,654	9,617
Mowers except Lawn Mowers	19,060	30,191	21,865	33,601	36,236	46,867	33,020	49,795	13,066	27,777
Harvesting Machines, NEC	6,858	47,808	8,248	58,184	8,624	55,789	5,106	25,627	3,504	17,756
Parts of Harvesting Machines	—	57,807	—	61,911	—	82,905	—	89,079	—	45,664
Farm Wagons & Carts	3,455	3,345	3,595	4,006	4,839	6,828	15,195	6,138	2,284	2,042
Agricultural Machines & Implements, NEC	—	143,876	—	161,517	—	184,730	—	192,247	—	122,862
Parts of Agricultural Machines	—	82,488	—	129,033	—	151,677	—	123,479	—	75,193
Tractors, Agricultural, Wheel-Type New, excluding Industrial*	127,964	807,047	130,734	866,824	101,922	1,056,533	96,466	1,122,068	58,004	672,065
Parts for Agri. Tractors	—	278,482	—	299,551	—	384,454	—	255,603	—	126,579
Walk-Behind Rotary Tillers	16,035	2,470	11,545	3,302	16,431	6,068	39,126	6,381	12,352	3,323

Source: U.S. Department of Commerce, International Trade Administration, Office of Capital Goods and International Construction. *Use of the term "industrial" here is understood to refer to such machines as forklifts but not to industrial tractors as commonly defined in the farm and industrial equipment industry. NEC — Not Elsewhere Counted.

New Agricultural Tractor Imports, Jan. 1989-June, 1990

(In Units)

	Country of Origin	Under 40 HP	40-79 HP	80-99 HP	100 HP & Over	Other*	Totals
Jan.-June, 1990	Belgium	—	845	45	1,250	95	2,235
	Brazil	—	52	13	31	20	116
	Canada	4	85	9	57	1	156
	China	93	12	—	—	—	105
	Czechoslovakia	169	556	25	54	—	804
	France	—	19	23	222	198	462
	Germany, West	82	5,926	2,967	360	586	9,921
	Italy	59	279	188	296	430	1,252
	Japan	21,934	1,424	140	23	1,623	25,144
	Korea	250	—	—	6	457	713
	Mexico	—	395	80	—	—	475
	Netherlands	—	—	—	2	15	17
	Romania	—	777	—	—	—	777
	Soviet Union	1,067	227	1,167	5	—	2,466
	United Kingdom	1,641	8,164	1,891	79	319	12,094
	Yugoslavia	—	182	—	—	—	182
	Totals	**25,825**	**19,279**	**6,548**	**2,386**	**3,966**	**58,004**
1989	Belgium	11	895	3	1,682	10	2,601
	Brazil	—	610	50	118	27	805
	Canada	38	336	17	86	1,927	2,404
	China	140	—	—	2	40	146
	Czechoslovakia	345	537	74	17	—	973
	France	4	105	102	343	301	855
	Germany, West	70	9,191	3,205	193	346	13,005
	Italy	541	553	165	504	997	2,760
	Japan	31,079	2,699	281	1,341	3,840	39,240
	Korea	235	—	—	8	829	1,072
	Mexico	5	1,325	127	120	3	1,580
	Netherlands	8	—	—	4	35	47
	Romania	57	1,329	—	—	—	1,386
	Soviet Union	388	87	1,402	261	571	2,709
	United Kingdom	4,874	15,469	3,137	212	1,296	24,988
	Yugoslavia	86	564	—	—	197	847
	Totals	**38,175**	**33,997**	**8,563**	**4,895**	**10,846**	**96,476**

Source: U.S. Department of Commerce, International Trade Administration, Office of Capital Goods and International Construction.

*For 1989 and 1990 "Other" includes units whose horsepower is not specifically provided, tractors without power take off and garden tractors, but not rotary tillers. Totals include countries not individually listed.

Shipments Of Farm Machines And Equipment In Units (1984-1989)

Type of farm equipment	1989	1988	1987	1986	1985	1984
Balers, hay (all types):	33,409	25,974	18,002	10,556	7,542	10,106
Blowers (includes forage type, combination grain-forage type)	3,104	3,773	2,907	2,375	2,636	3,939
Cabs, farm tractor	NA	NA	3,499	2,027	2,932	8,397
Cabs, other equipment	NA	NA				580
Combines, grain, pull-type and self-propelled	11,525	7,573	9,484	8,288	7,027	11,296
Combine corn and grain heads*	20,402	14,302	4,485	4,291	2,829	4,388
Cultivators, corn and cotton types	13,113	10,154	6,906	4,110	8,168	9,419
Cultivators, field:						
Pull-type, folding	6,403	4,207	2,940	1,504	3,897	6,655
Mounted and non-folding pull type	NA	NA	1,258	1,313	1,646	2,740
Cultivators, rotary	3,708	2,062	1,072	1,058	3,282	5,028
Cultivators and weeders, other	9,148	5,296	10,901	11,891	12,818	17,040
Cutters and shredders or rotary mowers (pto):						
Flail-type	3,772	4,879	2,913	1,434	4,523	19,786
Horizontal blade-type	231,683	229,498	140,462	100,854	98,459	94,452
Diggers (shakers, windrowers), combines, peanut	2,888	1,422	1,031	1,148	1,296	1,145
Distributors (fertilizer):						
Dry	19,525	15,862	5,206	4,545	6,143	8,205
Liquid	3,490	3,317	2,031	2,470	4,715	7,581
Anhydrous ammonia	NA	973	933	1,247	1,563	2,359
Dryers, grain, hay and seed batch type, pto or electric-motor operated	2,153	1,362	2,455	3,900	3,983	1,658
Continuous flow-type	801	556	544	765	695	942
Heated air units	2,447	2,005	3,588	6,378	9,818	7,198
Dusters, power, all types	NA	944	1,277	901	971	134
Elevators, portable:						
Single chain	1,490	1,726	1,627	1,467	2,839	3,057
Double chain	2,047	6,707	6,139	8,482	5,887	1,796
Auger-type, 6-in. dia.	7,499	7,947	9,269	8,188	7,939	11,468
Auger-type, 6-in. dia.	3,329	6,345	7,434	8,641	6,578	6,351
Auger-type, over 6-in. dia.	11,863	11,221	9,776	8,953	7,167	9,928
Elevators, stationary and other	7,029	7,045	44,404	60,069	37,749	36,229
Fans, crop drying and aeration	8,664	8,430	22,151	37,123	12,850	9,851
Grain drills, fixed-frame, all types	11,405	6,439	5,113	4,492	7,159	12,782
Grain heads for combines	*	*	9,212	9,835	9,978	14,151
Grinder-mixers, stationary and portable	3,718	4,211	3,406	1,717	1,467	2,907
Harrows, disk	13,234	17,892	11,498	12,048	17,908	25,330
Harrow sections (spike-, spring-, tine-tooth and power)	25,536	23,508	17,052	15,274	21,068	42,482
Harrows, other; rollers, pulverizers	7,564	7,330	7,583	6,325	9,388	19,051
Harvesters, beet and potato	317	289	260	195	345	486
Harvesters, forage, shear-bar type, self-propelled and pull	3,958	3,508	2,186	1,997	2,647	3,707
Harvesting machinery, other	4,080	4,242	2,915	2,986	4,073	3,989
Levelers or scrapers	2,601	1,829	2,065	1,992	2,034	4,199
Loaders, field, for baled hay	963	1,337	1,513	1,143	1,488	1,916
Loaders, tractor mounted, farm	16,425	27,494	14,078	20,960	17,900	26,153
Mills, feed, farm size (includes grinders and crushers of the hammer, burr or roller types)	2,301	2,322	2,537	2,073	2,416	2,623
Mixers, feed, farm size	2,343	2,646	1,983	1,360	1,671	1,894
Mixers, cutter bar-type	5,047	3,143	2,302	2,665	3,934	5,443
Mower-conditioners, self-propelled and pull-type	15,988	13,821	10,733	10,556	12,397	19,218
Planters, row crop, all types (quantity in number of rows)	38,926	19,734	34,352	20,311	37,417	58,674
Plows, chisel or sweep type:						
Pull-type	2,762	2,771	1,924	1,875	2,389	4,001
Mounted	2,192	1,825	1,777	930	1,477	2,065
Plows, disk-chisel combination	2,774	2,507	1,904	1,911	2,976	4,763
Plows, subsoiler	2,947	2,102	1,202	1,000	2,208	(NA)
Plows, terracing and ditching	383	1,663	294	417	753	1,029
Plows, moldboard, all types	859	760	1,327	1,902	1,902	4,566
Plows, middle busters and disk bedders	2,181	1,849	1,495	1,853	2,469	6,483
Rakes, hay, side-delivery	10,925	7,127	4,173	5,339	8,072	9,069
Sprayers, field and row crop type:						
Power, self-propelled	2,560	1,808	1,151	1,057	1,898	1,740
Power, tractor-mounted	10,640	9,513	8,417	8,604	14,146	17,205
Power, non-tractor-mounted	3,856	3,597	4,195	4,438	5,127	6,492
Sprayers, power, not held or row crop type	7,212	6,458	6,167	6,122	4,674	4,930
Sprayers, power, air-carried	2,762	2,310	1,647	1,993	2,603	3,650
Spreaders, manure						
Conveyor type	10,664	11,543	9,379	8,279	6,586	8,018
Tank type	2,869	2,840	2,415	2,440	2,371	3,448
Terracers, blade, or scrapers	32,874	32,862	54,879	43,679	48,071	50,645
Tillage equipment, combination roller/harrows, disk or coulter, field cultivators, disk or coulter/spring tooth	6,190	4,053	2,868	3,530	5,094	5,341
Tool bars, basic units, pull, mounted	1,413	1,572	1,402	1,511	1,729	1,663
Tractors, wheel, farm-type, 2-wheel drive, including front-wheel assist.						
Under 100 pto horsepower	NA	NA	9,323	13,017	12,653	15,706
100 pto horsepower and over	NA	NA	9,393	9,316	16,072	30,310
4-wheel drive	NA	NA	3,656	1,893	2,624	4,955
Wagons, farm type, chassis only, and trailer gear	31,931	28,728	23,511	18,411	17,442	24,471
Wagon boxes and racks for mounting on wagons and trailer gear						
Manual unloading or dump	14,985	15,219	15,365	13,013	14,032	14,423
Gravity unloading, grain type	11,153	10,870	8,383	7,545	5,712	6,687
Power unloading	14,311	11,977	9,667	8,694	7,912	9,304
Wagon boxes with integral running gear	2,293	2,739	2,646	1,818	2,205	2,380

*Figures for combine corn and grain heads listed together for 1988 and 1989, separately in prior years.

SOURCE: U.S. Department of Commerce Census bureau Current Industrial Report MA35A (89)-1, "Farm Machinery and Garden Equipment," issued October 1990, and previous years' MA35A reports. In some categories, I&T has combined data to save space.

Value of U.S. Farm Equipment Exports of Destination,

(Value in Thousands

Country	1986	1987
Western Hemisphere		
Canada	$649,405	$646,049
Mexico	76,496	67,894
Guatemala	5,034	4,603
Honduras	3,486	4,761
El Salvador	2,471	2,366
Costa Rica	3,718	3,954
Panama	5,057	7,811
Dominican Republic	11,925	14,502
Colombia	12,349	17,973
Jamaica	2,537	5,797
Venezuela	54,116	57,265
Brazil	18,447	22,619
Argentina	4,695	15,417
Bolivia	3,127	2,115
Chile	5,638	8,462
Ecuador	11,044	6,051
Peru	6,131	5,812
Paraguay	3,156	2,874
Europe		
Denmark	2,933	5,797
Sweden	3,366	9,882
United Kingdom	53,344	63,063
Netherlands	12,463	12,052
Belgium-Luxemburg	40,770	49,830
France	68,371	95,630
West Germany	51,695	55,058
Hungary	13,151	8,763
Switzerland	2,701	2,149
Spain	20,838	22,150
Italy	13,150	13,218
Greece	5,045	2,169
Soviet Union	10,673	1,175
Yugoslavia	2,924	1,616
Middle East		
Israel	7,459	7,232
Saudi Arabia	73,559	115,555
Turkey	3,534	4,905
Jordan	942	2,938
Asia and Pacific		
Thailand	942	1,590
Singapore	5,264	8,057
China (Taiwan)	2,727	3,304
China (P.R.C.)	11,950	9,634
Philippines	2,297	2,525
Korea	2,706	5,929
Japan	18,876	25,949
Australia	47,670	49,110
New Zealand	2,706	2,108
Africa		
Algeria	6,168	4,680
Morocco	526	4,156
Sudan	3,811	5,902
Nigeria	5,967	4,483
Egypt	15,876	4,680
Rep. South Africa	25,011	24,034
Total U.S. Exports, Farm & Industrial Equipment	$1,409,690	$1,579,894

Source: U.S. Department of Commerce, International Trade and International Construction.

& Industrial by Countries 1986-1990

of Dollars)

1988	1989	Jan.-June, 1990
$584,645	$724,437	$457,866
121,734	142,873	106,621
5,214	8,853	3,491
6,193	7,138	2,548
2,230	3,371	835
5,171	6,775	3,090
3,449	4,048	2,051
19,819	16,698	8,204
17,050	15,879	8,366
3,109	10,147	4,098
62,649	22,786	8,759
24,968	21,076	10,098
8,089	6,689	2,325
657	1,219	973
12,332	16,975	9,122
7,035	17,186	5,471
9,357	4,187	3,848
1,072	644	566
8,918	9,459	4,684
26,197	24,494	15,674
98,173	106,960	64,564
18,096	18,531	15,945
82,298	84,919	48,443
128,925	161,346	87,924
75,788	78,791	52,861
4,626	27,089	7,051
3,795	5,287	4,430
25,172	40,192	20,127
20,352	22,865	18,764
19,936	16,345	4,196
8,602	2,700	2,270
5,417	1,631	3,721
7,341	6,952	5,149
129,930	97,384	41,240
5,210	2,810	618
2,574	1,526	514
4,212	4,265	1,939
10,967	51,697	24,272
5,627	12,161	6,229
10,096	13,430	6,848
4,838	5,098	1,014
15,053	18,414	11,238
35,305	86,141	54,331
121,834	208,739	101,758
3,022	7,154	3,803
5,855	3,242	405
3,696	1,421	499
5,623	3,161	1,254
3,408	4,265	1,253
3,316	6,564	4,732
40,583	38,768	17,096
$1,911,409	**$2,302,808**	**$1,349,315**

Administration, Office of Capital Goods

Value of Shipments, 1984-1989
Farm Tractors, Farm Machinery and Garden Equipment Including Parts, Attachment

(In Thousands of Dollars)

Type of product	1989	1988	1987	1986	1985	1984
Wheel tractors farm type	**NA***	**NA***	**958,597**	**893,432**	**1,154,527**	**2,045,298**
Planting, seeding and fertilizing machinery	632,247	508,566	409,082	371,210	453,250	601,099
Harrows, rollers, pulverizers, stalk cutters	206,283	136,923	99,918	99,238	166,014	242,884
Plows	136,770	117,725	74,643	75,310	110,984	152,464
Harvesting machinery	1,860,432	1,422,751	1,282,315	1,230,124	1,190,831	1,424,639
Haying machinery	732,250	574,587	433,671	383,434	498,116	611,568
Farm dairy machines and equipment	110,050	95,492	76,584	77,131	92,308	105,430
Sprayers and dusters	302,022	274,994	214,484	212,566	244,412	252,992
Farm elevators and blowers	59,358	64,342	73,648	82,042	66,877	69,773
Cultivators and weeders	202,037	154,471	104,619	81,103	139,985	175,355
Machines for preparing crops for market or use	208,641	193,275	208,189	203,657	193,727	197,790
Farm poultry equipment	157,762	144,149	116,763	93,420	109,000	120,646
Hog equipment	64,718	75,717	66,415	41,964	35,938	44,038
Other barn and barnyard equipment	215,582	214,133	164,142	129,146	156,768	168,912
Stalk shredders and cutters or rotary mowers	192,460	197,576	161,462	112,073	120,581	126,797
Farm wagons, other farm transportation equipment	2,207,172	1,725,202	149,217	109,291	105,480	133,386
Irrigation systems	377,790	298,307	215,689	160,417	186,654	364,138
Total farm machinery	**NA**	**NA**	**5,324,025**	**4,355,565**	**5,402,166**	**7,170,967**
Total agricultural equipment	**8,297,091**	**6,793,254**	**6,282,621**	**5,248,997**	**6,556,693**	**9,216,265**
Commercial turf, mowing equipment	496,797	473,509	416,240	347,482	316,566	280,891
Other turf, grounds care equipment	129,720	121,535	98,346	65,354	59,148	52,872
Total commercial grounds equipment	**626,517**	**595,044**	**514,586**	**412,836**	**376,704**	**333,763**
Consumer nonriding lawn, garden, snow equipment	1,976,326	1,993,863	1,911,663	1,743,210	1,688,642	1,614,573
Consumer riding lawn, garden, snow equipment	1,767,916	1,943,096	2,068,286	1,642,630	1,466,472	1,363,481
Total lawn & garden equipment	**3,744,242**	**3,936,959**	**3,979,949**	**3,385,840**	**3,155,114**	**2,978,045**
Totai farm tractors, farm machinery, Commercial and consumer equipment	**12,036,333**	**10,730,213**	**9,303,973**	**9,047,653**	**10,088,611**	**12,528,073**

*Tractors included with "Farm Wagons, other farm transportation equipment" for 1988 and 1989.

SOURCE: U.S. Department of Commerce Census Bureau Current Industrial Report MA35A-(89)-1, "Farm Machinery and Garden Equipment," issued October 1990, and previous years' MA35A reports.

Exports of Farm Equipment by Product, 1987-1990

Product	Jan.-Dec. 1987		Jan.-Dec. 1988		Jan.-Dec. 1989		Jan.-June 1990	
	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands
Combines, pull-type	1,734	$34,099	644	$9,766	1,228	$17,501	530	$14,447
Combines, self-propelled	3,623	135,010	2,333	96,119	5,261	160,057	1,928	90,268
Cultivators, tractor-drawn or mounted	968	2,295	1,748	4,332	2,585	5,109	625	948
Cultivators, NEC, and Weeders	3,713	4,812	6,031	6,902	4,728	7,416	9,143	40,357
Farm Elevators and Blowers	1,498	3,795	1,866	5,326	NA	NA	NA	NA
Farm Wagons and Carts	1,197	2,041	1,863	4,490	2,488	5,688	—	—
Parts for Farm Wagons and Carts	—	952	—	709	—	2,815	—	—
Fertilizing Machines	4,461	9,772	5,055	10,906	8,532	13,942	5,191	10,400
Forage Harvesters	1,046	22,655	1,878	30,355	1,677	32,209	963	19,126
Harrows, Disk	920	3,524	1,316	4,649	1,960	6,403	998	3,458
Harrows, NEC, & Soil Pulverizers	4,688	5,030	8,786	8,145	5,616	5,079	3,028	3,199
Parts for Harrows, Stalk Cutters & Soil Pulverizers	—	3,816	—	3,293	—	5,817	—	1,445
Harvesting Machines, NEC	3,603	38,503	3,915	63,330	2,399	42,473	920	10,877
Harvesting Machine Parts	—	115,839	—	53,509	—	44,206	—	50,261
Hay Balers	5,429	41,400	9,033	54,993	9,765	60,693	4,930	44,618
Haying Machines, NEC (incl. rakes & tedders)	2,439	17,655	3,460	18,954	4,830	29,538	2.757	21,481
Parts for Haying Machine	—	15,703	—	23,278	—	20,510	—	10,674
Mowers, Cutterbar, tractor-drawer	985	3,042	1,659	4,930	7,102	12,649	9,107	19,776
Mowers, Rotary, tractor-drawn (excl. lawn mowers)	11,388	5,953	14,057	8,504	39,172	20,075	10,978	6,951
Mowers, NEC, tractor-drawn (excl. lawn mowers)	1,480	6,597	3,335	7,773	2,231	6,930	381	1,049
Planting Machines	2,134	7,216	1,818	7,152	3,260	11,027	2,356	8,349
Plows, Disk	669	1,651	597	1,511	517	1,843	270	678
Plows, Moldboard	1,380	4,358	1,122	4,320	394	1,903	259	1,130
Plows & Listers, NEC	4,247	7,609	4,369	9,083	5,403	15,190	1,674	4,853
Parts for Plows, Listers, Cultivators & Weeders	—	9,393	—	9,922	—	9,328	—	1,660
Seeding Machines	4,591	9,637	3,984	11,469	6,340	17,193	5,143	16,234
Parts for Planting, Seeding & Fertilizing Machines	—	9,763	—	17,761	—	15,853	—	10,062
Sprayers, Agricultural, including parts	—	179,147	—	227,752	—	294,425**	—	206,039
Farm Tractors:								
Under 40 PTO HP	881	4,862	730	3,582	6,805*	30,165*	39,213*	10,795
40-59 PTO HP	395	4,688	211	2,378	177	1,850	108	1,364
60-79 PTO HP	247	3,531	212	2,551	125	1,983	58	1,131
80-99 PTO HP	375	9,075	158	3,238	93	2,445	100	3,466
100-119 PTO HP	429	13,629	1,016	32,855	1,050	34,753	551	18,169
120-139 PTO	825	29,019	1,597	56,292	2,039	67,530	836	31,524
140-159 PTO HP	655	24,101	1,353	52,073	2,184	80,612	854	36,221
160-179 PTO HP	1,029	43,592	804	33,914	1,303	54,961	506	23,054
180 PTO HP & Over	912	59,430	1,016	56,686	2,051	107,834	1,133	68,713
Other Farm Tractors	2,544	26,711	2,306	31,617	2,815	25,731	2,099	37,407
Parts for Farm Tractors	—	517,150	—	680,695	—	621,271	—	263,791

SOURCE: U.S. Department of Commerce, International Trade Administration, Office of Capital Goods and International Construction. *1989 and 1990 data appear to include garden tractors. **Includes irrigation equipment.
NEC - Not Elsewhere Counted.

INDUSTRY UPDATE

U.S. Tractor Sales Rebound In October

After a sharp nosedive in September, U.S. sales of 4-wheel drive tractors rose smartly in October, representing a bright spot in a machinery market that may be recovering from a downward trend that began in August, apparently in response to Iraq's invasion of Kuwait and the subsequent U.S. military response. Figures from the Equipment Manufacturers Institute flash report, showed combine sales down for September and October, but up for the year as a whole. Total tractor sales through October remained about equal to 1989, but with upturns in the higher-dollar brackets above 40 hp. Weak sales for under-40-hp units generally reflect the soft housing market rather than the agricultural market.

U.S. - UNIT RETAIL SALES

	October			January-October			September 1990 Inventory
Equipment	1990	1989	% Change	1990	1989	% Change	N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	2,812	4,019	(30.0)	37,569	42,047	(10.6)	41,461
40 & Under 100 HP	3,285	3,108	5.7	33,100	29,904	10.7	23,575
100 HP & Over	2,566	2,670	(3.9)	17,291	16,426	5.3	15,907
Total 2-Wheel Drive	**8,663**	**9,797**	**(11.6)**	**87,960**	**88,377**	**(.5)**	**80,943**
Total 4-Wheel Drive	**618**	**488**	**26.6**	**4,147**	**3,371**	**23.0**	**2,742**
Total Farm Wheel Tractors	**9,281**	**10,285**	**(9.8)**	**92,107**	**91,748**	**.4**	**83,685**
Combines: (Self-Propelled)	1,381	1,707	(19.1)	8,140	7,133	14.1	5,527

U.S. - UNIT RETAIL SALES

	September			January-September			August 1990 Inventory
Equipment	1990	1989	% Change	1990	1989	% Change	N.A.Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	2,982	3,811	(21.8)	34,729	38,028	(8.7)	41,294
40 & Under 100 HP	2,550	2,524	1.0	29,831	26,796	11.3	22,793
100 HP & Over	1,169	1,760	(33.6)	14,727	13,756	7.1	14,762
Total 2-Wheel Drive	**6,701**	**8,095**	**(17.2)**	**79,287**	**78,580**	**.9**	**78,849**
Total 4-Wheel Drive	**195**	**318**	**(38.7)**	**3,529**	**2,883**	**22.4**	**2,584**
Total Farm Wheel Tractors	**6,896**	**8,413**	**(18.0)**	**82,816**	**81,463**	**1.7**	**81,433**
Combines (Self-Propelled)	1,167	1,253	(6.9)	6,764	5,426	24.7	5,482

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Canadian Results: General Slump

Tractor and farm machinery sales in Canada weakened in August and September against the results seen in 1989, with sales down for the year in all categories except 4WD tractors, forage harvesters and mower conditioners.

Canada Report Retail Sales In Units

	August			August/YTD		
Equipment	**1990**	**1989**	**% Chg.**	**1990**	**1989**	**% Chg.**
Farm Wheel Tractors						
2WD under 40 H.P.	284	339	-16.2%	2,653	2,738	-3.1%
2WD 40-99 H.P.	523	488	7.2%	4,634	5,021	-7.7%
2WD 100 H.P. & Over	96	144	-33.3%	1,683	1,790	-6.0%
Total 2WD	903	971	-7.0%	8,970	9,549	-6.1%
Total 4WD	89	70	27.1%	1,158	897	29.1%
Total Farm Wheel Tractors:	**992**	**1,041**	**-4.7%**	**10,128**	**10,446**	**-3.0%**
COMBINES						
Self Propelled	254	333	-23.7%	703	689	2.0%
Pull Type	47	214	-78.0%	105	373	-71.8%
BALERS						
Rectangular Balers	162	184	-12.0%	928	1,065	-12.9%
Round Balers	585	647	-9.6%	2,942	2,915	0.9%
SWATHERS						
Self Propelled	194	274	-29.2%	498	613	-18.8%
Pull Type	415	485	-14.4%	830	1,003	-17.2%
FORAGE HARVESTERS						
Shear Bar Type	79	54	46.3%	388	354	9.6%
MOWER CONDITIONERS	475	384	23.7%	2,701	2,584	4.5%

Canada Report Retail Sales In Units

	September			September/YTD		
Equipment	**1990**	**1989**	**% Chg.**	**1990**	**1989**	**% Chg.**
Farm Wheel Tractors						
2WD under 40 H.P.	175	314	-44.3%	2,825	3,052	-7.4%
2WD 40-99 H.P.	428	597	-28.3%	5,054	5,618	-10.0%
2WD 100 H.P. & Over	102	181	-43.6%	1,786	1,971	-9.4%
Total 2WD	705	1,092	-35.4%	9,665	10,641	-9.2%
Total 4WD	75	92	-18.5%	1,233	989	24.7%
Total Farm Wheel Tractors:	**780**	**1,184**	**-34.1%**	**10,898**	**11,630**	**-6.3%**
COMBINES						
Self Propelled	252	357	-29.4%	963	1,046	-7.9%
Pull Type	44	133	-66.9%	134	506	-73.5%
BALERS						
Rectangular Balers	92	120	-23.3%	1,025	1,185	-13.5%
Round Balers	306	402	-23.9%	3,245	3,317	-2.2%
SWATHERS						
Self Propelled	138	174	-20.7%	633	787	-19.6%
Pull Type	246	239	2.9%	1,065	1,242	-14.3%
FORAGE HARVESTERS						
Shear Bar Type	56	53	5.7%	444	407	9.1%
MOWER CONDITIONERS	262	207	26.6%	2,977	2,791	6.7%

Source: Canadian Farm & Industrial Equipment Institute.

Massey Picks L&G Supplier

MASSEY-FERGUSON is putting it's name back in the lawn and garden business, and has selected Ingersoll Equipment Co. as a sole-source supplier of lawn and garden tractors to be sold under the Massey-Ferguson name plate starting with the spring 1991 season.

The new product line will give Massey dealers products ranging from an 8-horsepower rear engine riding lawnmower up to a 180 hp tractor.

Ingersoll, of Winneconne, Wis., was formed from a 1983 buyout of the J.I. Case garden tractor line, which was distinguished by its heavy use of hydraulic drive systems.

In 1979, Snapper bought Massey-Ferguson's yard and garden tractor product line.

Steve McDaniels, Massey's vice president of marketing, said that Massey, having recovered from the farm depression of the 1980s, now "wants to become a more valuable supplier for its dealers by providing a greater assortment of high quality products that fit its dealers needs." He noted that while Massey, with 1,100 dealers, has its traditional base in agricultural and rural areas, Ingersoll, with 500 dealers, is strong in affluent metro suburbs.

McDaniels said there are only about 15 Massey dealers who currently carry the Ingersoll line, and acknowledged that many Massey dealers have taken on other lawn

(See INGERSOLL, pg. 31)

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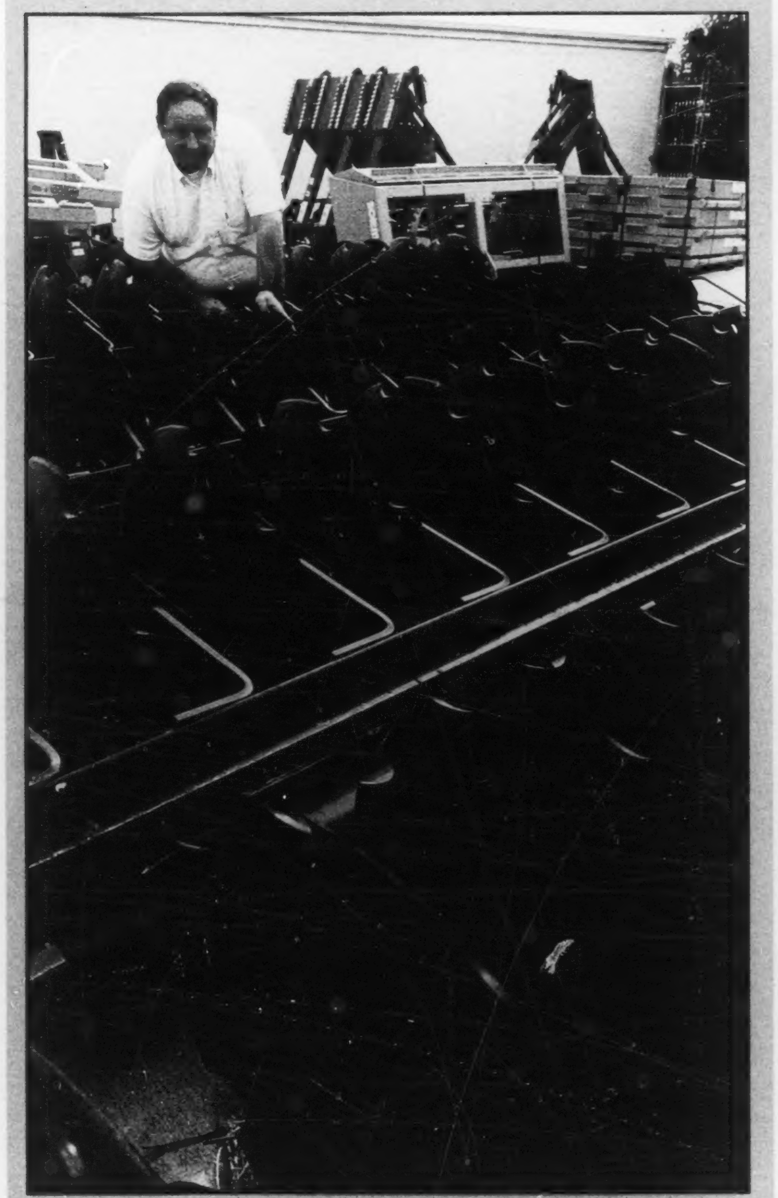
LEASING EXPANDS OPTIONS PAGE 7

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, No. 1 JANUARY 1991



SALES MANAGER Darryl Fountain keeps close watch on Solex operations in several western states, including Hawaii. The Dixon, Calif., company has built a successful business importing specialty implements. Story on page 12.

For Small Utility Engines

California Air Law Sets Precedent

By HARRY CLINE

CALIFORNIA has adopted the nation's first emission control standards for small utility engines, the type used in mowers, leaf and grass blowers, string trimmers and other lawn and garden power tools.

"All pollution sources, both big and small, must do their share if we are ever able to offer all Californians air that is healthy to breathe," says James D. Boyd, California Air Resources Board (CARB) executive officer. "We've been regulating some major pollution sources, such as motor vehicles and oil facilities for more than 20 years and these small utility engines have much higher emissions for their size, simply because they have been unregulated up to this point."

Many of these small engines, according to CARB, emit up to 50 times more pollution per horsepower than a typical truck engine. A lawn mower running for 30 minutes will match a car's hydrocarbon output over 172 miles. Combined, the pollution from all small engines operating in the state equal the hydrocarbons from 3.5 million 1991 model

(See EMISSIONS, pg. 3)

All Dealers Face Threat Of Lawsuit

By SCOTT NESBITT

EDITOR'S NOTEBOOK

IT WOULDN'T happen here. Folks aren't like that."

You may note that thought going through your head while watching "L.A. Law" and those make-believe people going after each other's throats in court.

Like a lot of other people blessed with the chance to live outside the violent atmosphere of the big cities, you may place greater reliance in the goodwill of your neighbors and customers.

Don't bet on it.

Chances are you've already risked every penny you're ever earned in business, and maybe every penny you'll earn for the rest of your life.

Has your parts department ever sent a customer out the door with a part that "will probably work?"

It hardly matters what the part is. It could be a drive sheave or a V-belt, or maybe a roller bearing, U-joint or brake pad. It could be something as seemingly minor as

(See LAWSUIT, pg. 2)

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

JANUARY 1991
VOL. 106, NO. 1

IMPLEMENT & TRACTOR
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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years — $30. Single copies, $3.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953 $3.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
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EMISSIONS—

(From pg. 1)

cars, each driven 16,000 miles per year.

"We are simply asking these (small engine) manufacturers to take the first step in controlling their pollution just like car manufacturers and others did years ago," Boyd says.

The 2 standards set recently by CARB will cut emissions of smog-forming hydrocarbons and nitrogen oxides by 46 percent by 1994, the first year of a 2-phase program, and by 55 percent by 1999, according to CARB, which estimates the standards will reduce emissions by about 433 tons per day statewide by 2010. Engines produced after Dec. 31, 1993 must be certified as meeting 1994 CARB standards and Dec. 31, 1998 is the deadline for meeting 1999 emission levels.

Just like car manufacturers found when California jumped the gun on the rest of the nation and established pollution emission levels for automobiles before the federal government did, it will cost the small-engine manufacturers more to modify or redesign engines to meet those standards. And, just like Detroit, those costs will be passed on to those who own and operate small engine-powered lawn and garden power tools.

CARB estimates the additional pollution control measures will run the cost up an average of $30 per unit. John Liskey, director of technical and statistical services for the Outdoor Power Equipment Institute says it may not be quite that high, but it most certainly will average $15 to $20 more per unit sold.

"The $30 was based on the initially proposed and more stringent pollution control guidelines announced by CARB," says Liskey. OPEI managed to get CARB to modify those first set of regulations, which Liskey said would have virtually banned all 2-cycle engines by 1994 and many small 4-stroke engines.

Most manufacturers, he says, can provide products to lawn care professionals and homeowners within the 1994 emission standards. "They may not have all products in existence that they now have, but most engines can be modified to meet the first set of standards. The majority of the manufacturers believe they can do business under the '94 guidelines without too much impact.

"The 1999 standards, however, are a big unknown. If you ask most manufacturers today whether they can meet them, the answers would be 'no'. But, what will happen in the next 5, 6 or 7 years is a big unknown. However, it is obvious that to meet those requirements will mean radically changing products or creating new add-on technology like catalytic converters," Liskey said.

"It will be easier for manufacturers of premium, higher priced products to absorb that added cost, people like John Deere, Toro and Honda. While adding $30 to the cost of a $450 mower is significant and will have an impact, it will not have the same impact as it would for mass merchandisers who are faced with adding $30 to the cost of $129 mowers."

At this point, the new rules are all inclusive to everyone who buys new lawn and garden power tools in California. And, they soon may cross California's borders into other states.

"California can be viewed 'coming attractions' for the rest of the country," according to Dennis Cox, president of OPEI. That's especially true since there are no federal pollution standards for small utility engines.

The Environmental Protection Agency is just now beginning its study on these small engines, which were included in the federal clean air act through amendments signed into law last November.

"We are just getting under way on a study looking at the contribution these small engines make to air quality problems," says Paula Van Lare, environmental engineer with the EPA's division of mobile sources in Ann Arbor, Mich. "We are supposed to have it finished by Nov. 15, 1991."

Other states are apparently considering following California's lead and not wait for EPA. "We have heard rumors that Oregon and New York were considering adopting California's regulations, but as far as we know, nothing firm has come down," says Liskey. "However, I do believe the majority of the states will wait for the EPA standards because most of them do not have pollution problems as serious as California's."

California's right to even set standards has been challenged by the Equipment Manufacturers Institute (EMI) which says passage of the 1990 federal Clean Air Act Amendments preempts CARB from regulating farm and construction equipment under 175 horsepower.

EMI took a lead role on the side of large machinery in dealing with both California and the federal government. In early December, it established a liaison with the Ann Arbor, Mich., office of the EPA, which will handle coordination of the new standards.

Emmet Barker, EMI president, who led lobbying and legislative effort for the Clean Air Act, called the provisions establishing a single federal standard a "major victory" for the equipment industry.

But CARB rejected the argument of federal law preempting state regulations in setting the standards. "Our regulations, as we see them, do not concern farm and construction equipment, but utility engines used primarily in gardening," says CARB spokesman Jerry Martin. "We feel we are on very firm ground," indicating that it is up to EPA to challenge California's right to set emission standards for small engines.

Liskey said California's lead, regardless of whether it's valid or invalid, certainly sets the precedent for not only other states, but EPA as well, and that is why the institute lobbied hard during its 10 months of negotiations with CARB to not only set what it considered as realistic, achievable standards, but to look at

(See EMISSIONS, pg. 22)

Exhaust Emission Standards for 1994-1998 Utility Engines

Emissions Standards (grams/brake horsepower hour)

	Total Hydrocarbons + Nitrogen Oxides	Carbon Monoxide	Particulate-Diesels
All Engines (i.e. 4-stroke engines)			
Above 225 cc Displacement	12.0	300	0.9
Under 225 cc Displacement	10.0	300	0.9

	Total Hydrocarbons	Carbon Monoxide	Nitrogen Oxides	Particlulates
Hand-Held Equip. Engines (i.e. 2-stroke engines)				
Above 50 cc Displacement	180	600	4.0	–
Under 50 cc Displacement	120	300	4.0	–
Under 20 cc Displacement	220	300	4.0	–

Exhaust Emission Standards for 1999 and Subsequent Utility Engines

Emissions Standards (grams/brake horsepower hour)

	THC + NOx	CO	PM-Diesels
Non Hand-Held Equip. Engines	3.2	100	0.25

	THC	CO	NOx	PM
Hand-Held Equip. Engines	50	130	4.0	0.25

INDUSTRY UPDATE

Sales:

Nice November Numbers

With the exception of still-lagging sales of tractors under 40 horsepower, the U.S. machinery market showed improvement in November over 1989 results, and showed a rebound from the late-summer slump apparently triggered by Iraq's invasion of Kuwait, according to the Equipment Manufacturers Institute report.

Especially encouraging for the industry as the year finishes up was a 23.9 percent rise in 4wd tractor sales and a 15.5 percent rise in combine sales. Inventory figures for October showed stockpiles below the 12-month level that some analysts consider the "glut" level, but well above the 6-month supply that produces, in some analyses, higher prices for dealers.

U.S. - UNIT RETAIL SALES

	November			January-November			October 1990 Inventory
Equipment	1990	1989	% Change	1990	1989	% Change	N.A.Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	2,212	2,475	(10.6)	39,827	44,522	(10.5)	41,497
40 & Under 100 HP	2,419	2,368	2.2	35,536	32,272	10.1	24,665
100 HP & Over	1,974	1,726	14.4	19,248	18,152	6.0	16,382
Total 2-Wheel Drive	6,605	6,569	.5	94,611	94,946	(.4)	82,544
Total 4-Wheel Drive	522	396	31.8	4,669	3,767	23.9	2,662
Total Farm Wheel Tractors	7,127	6,965	2.3	99,280	98,713	.6	85,206
Combines (Self-Propelled)	1,213	965	25.7	9,352	8,098	15.5	5,548

Shipments Of Key L&G Products Show Increase For 1990

Twelve month industry shipments of key lawn and garden products increased in the 1990 model year according to estimates by the Outdoor Power Equipment Institute (OPEI).

The key consumer lawn and garden products were: walk-behind power mowers, lawn tractors, riding mowers, garden tractors, and walk-behind tillers. The model year for these products is September 1, 1989 through August 31, 1990.

Total shipments for the key products were 7,288,000 units. By product category, Front Engine Lawn Tractors and Riding Garden Tractors showed a significant increase, 12% respectively.

Walk-behind mowers totaled 5,700,000 units, an increase of 8%. Rear Engine Riding Mowers showed a slight decrease to 247,000 units. Walk-behind tillers decreased approximately 2% to 300,000 units.

OUTDOOR POWER EQUIPMENT INSTITUTE
1990 INDUSTRY SHIPMENT ESTIMATES

	1990	1989	% Change
Walk-Behind Power Mowers	5,700,000	5,300,000	+8%
Lawn Tractors & Riding Mowers	1,132.000	1,053,000	+8%
Front Engine	885,000	793,000	+12%
Rear Engine	247,000	260,000	-5%
Riding Garden Tractors	156,000	139,000	+12%
All Riders	1,288,000	1,192,000	+8%
Rotary Tillers	300,000	305,000	-2%
TOTAL	**7,288,000**	**6,797,000**	+7%

Allied Reports 3rd Quarter Loss

Allied Products Corp., parent company of White-New Idea, Bush Hog and Lilliston, reported a net 3rd quarter 1990 loss of $3,441,000 on net sales of $115,295,000 through all units of the company, which has operations in transportation, industrial products and chemical specialties in addition to the farm equipment subsidiaries.

For the 1st 9 months of the year, Chicago-based Allied Products recorded net sales of over $406 million and a net income of almost $1.27 million, a drop from 1989 results from the same period of $452.6 million in net sales and $3.47 million in net income.

Richard A. Drexler, president and chief executive officer, said sales of the agricultural equipment group "softened somewhat during the (3rd) quarter, in line with a general industry trend." □

Canadian Sales Slump Continues

Weakness remained the watchword in the Canadian farm machinery market through November, according to figures released by the Canadian Farm & Industrial Equipment Institute.

Through the first 11 months of 1990, sales were down in all categories except for mower conditioners, which showed an 8.9 percent rise.

Canada Report
Retail Sales In Units

	November			November-YTD		
Equipment	1990	1989	% Chg.	1990	1989	% Chg.
Farm Wheel Tractors						
2WD under 40 H.P.	227	270	-15.9%	3,355	3,707	-9.5%
2WD 40-99 H.P.	492	541	-9.1%	6,368	6,971	-8.7%
2WD 100 H.P. & Over	154	142	8.5%	2,281	2,626	-13.1%
Total 2WD	873	953	-8.4%	12,004	13,304	-9.8%
Total 4WD	96	141	-31.9%	1,448	1,336	11.4%
Total Farm Wheel Tractors:	969	1,094	-11.4%	13,492	14,640	-7.8%
COMBINES						
Self Propelled	64	119	-46.2%	1,320	1,513	-12.8%
Pull Type	10	12	-16.7%	174	617	-71.8%
BALERS						
Rectangular Balers	57	53	7.5%	1,144	1,358	-15.8%
Round Balers	89	90	-1.1%	3,628	3,726	-2.6%
SWATHERS						
Self Propelled	31	29	6.9%	724	904	-19.9%
Pull Type	19	25	-24.0%	1,157	1,378	-16.0%
FORAGE HARVESTERS						
Shear Bar Type	16	41	-61.0%	513	514	-0.2%
MOWER CONDITIONERS	116	70	65.7%	3,276	3,008	8.9%

SIMA Exhibition In March

The next SIMA Exhibition will take place in March, 1991 in Paris, France.

This International Exhibition is a unique opportunity to promote and discover the newest technologies in agricultural machinery. More than 1,000 exhibitors from 25 countries will present their most innovative equipment.

As the 1990 SIMA Exhibition drew over 650,000 professional visitors, with 40,000 coming from 96 different countries, an increased and worldwide turn-out is expected in 1991.

This event will be divided into two specialized exhibitions:

SIMA—The SALON INTERNATIONAL DE LA MACHINE AGRICOLE (The International exhibition of Farm Machinery) will take place March 3-7, 1991, in all 6 halls of the Parc des Expositions at the Paris Nord-Villepinte. The Exhibition will take place on a surface area of over 1.7 million square feet with all types of agricultural machinery exhibited, such as tractors, tillers, soil preparation machines, seeders, irrigation materials, harvesters, as well as farm machinery parts, accessories, hydraulic equipment and electrical components.

SIMA—PRODUCTIONS ANIMALES (The International Exhibition of Livestock Production) will take place March 5-8, 1991, in Hall 7 of the Parc des Expositions at the Paris-Port de Versailles, just next to the 'General Contest' of animals. This Exhibition will be the most important event on breeding equipment in Europe with a surface area of over 800,000 square feet. This Exhibition will combine SIMA-VIP/SIMA ELEVAGE (The International Exhibition of Animal Breeding Equipment), SITEPAL (The Bulk Feed Processing Show) and LES EQUIPEMENTS LAITIERS ET DIVERS POUR L'ELEVAGE (The Dairy and Miscellaneous Equipment for Stock Breeding Exhibition). □

BRIEFLY...

Case International is funding a University of Arkansas study of variables affecting rice harvest loss and rice kernel quality.

A major goal is to develop a computer program that will analyze how factors such as moisture content and harvesting methods affect the crop and making the knowledge available to farmers and scientists.

Case is funding the project in cooperation with the Rice Foundation and the Arkansas Rice Research and Promotion Board. □

LAWSUIT

(From pg. 2)

John Deere dealers then made arrangements with customers to have their machines receive the product improvement program.

"The combine owner in the case of Burke vs. Deere was aware of Deere's product improvement program. Indeed, at the time of the accident, the combine owner had already made plans with his dealer to have the necessary work performed at the dealership."

Notice that a dealership was involved, and was apparently trying to do the right thing in this situation. Deere was also trying to do the right thing. The jury determined that Burke was 40 percent at fault; meaning he would receive only 60 percent of the actual damages.

Still, the injury decided that Deere was guilty of "willful and wanton disregard for the rights and safety of another," and make the award of $50 million in damages. A story in the Omaha World-Herald on Nov. 29, 1990, said the bulk of that money, if finally awarded, could end up in a special fund to aid others injured in combine accidents.

Might the money provide a "war chest" to help mount other court cases against other farm machinery companies?

The prospects are frightening, if uncertain at present.

What is certain is that there's no protection for a dealer who figures he needn't worry about being sued because small-town folks just don't do those things. Stanton, Iowa, and Supulpa, Okla., aren't Metropolis, and there's no Super Man in the form of a multi-billion-dollar manufacturer waiting to swoop in and save the good-hearted but ill-advised dealer who figures he can just let things slide. □

EMISSIONS

(From pg. 3)

different types of equipment that may be use widely outside of California.

"In our discussions with CARB, we made statements concerning the federal responsibility California had in setting its state standards," Liskey said. An example of that was *in the categories, one* for "all engines" and another for "hand-held equipment engines." While most 2-cycle engine applications fall under the later category and 4 stroke under the former, there are exceptions, like lightweight, walk-behind snow blowers, not a big item in California but one that is very common in many other parts of the country.

Liskey says there are many 2-cycle lawn mowers sold today, but California regulators assumed that they could be easily replaced by 4-stroke units. But, that's not the case for many snow blowers which need to be light weight and maneuverable.

"We were able to carve out a deal to cover these hybrid 2-stroke applications that are important elsewhere in the country," Liskey says. "We knew that these 2-cycle applications could not meet the 'all engines' requirements which would essentially ban many snow blowers. It was important that we gain exemptions for them because of the impact California's regulations would have elsewhere."

While the 1999 standards have been issued, they are not necessarily in concrete, according to Liskey. "We fought hard to get CARB to move the final standards out to at least 2002 or 2003 because CARB had not really done any kind of in-depth study on the cost requirements of making some of the radical changes that will be necessary to meet the final standards," Liskey says. Unfortunately for the manufacturers, the 9-member CARB board stuck with its staff recommendations of 1999 at the target year for achieving the final emission standards.

However, OPEI did manage to get CARB to agree to progress review in 1994 and 1996. "If progress is not adequate, CARB could relax the emission levels or move the dates for compliance to another year. The industry also has an opportunity under the regulations to petition CARB to move dates. There's at least some flexibility in the regulations, which is the best we could do at this point.

"The decade of the '90s have been labeled the decade of the environment, and California's action certainly reflects that," says Liskey. □

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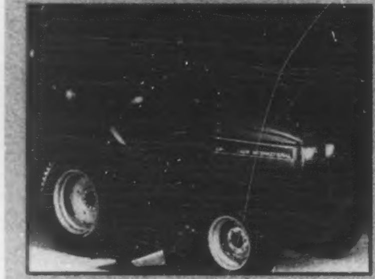
Correction

Implement & Tractor inadvertently transposed two columns in its "Farm Wheel Tractor Retail Sales By State" table in the Nov-Dec issue. The columns transposed were for 1989, 2-wheel drive and 4-wheel drive units. □

Case Introduces Compact Tractor Line

ASE International is introducing its new 1100 Series line, 3—compact tractors ideal for a variety of jobs on farms, estates, parks and golf courses.



"The 1100 Series tractors offer rugged dependability combined with state-of-the-art components and systems that customers have told us they want," says Bruce Rabe, brand manager for Case International compact tractors. The series includes the 19-hp 1120, 23-hp 1130 and 27-hp 1140.

Standard equipment on all three models includes hydrostatic power steering, a tilt steering wheel and foldable roll-over protective structure. The three-cylinder diesel engines are fully enclosed with mufflers located under the hood and underslung exhausts for better visibility.

A tilt-up hood, removable engine side panels and pull-out radiator screen allow easy servicing. A glow-plug starting aid speeds start-ups on cold mornings. "Engines on the 1130 and 1140 feature direct fuel injection," Rabe says.

Every 1100 Series model is equipped with rear and mid-tractor power take-off (PTO) shafts. The rear PTO rotates at 540 rpm and the mid PTO at 2,000 rpm.

"Live" PTO on the 1130 and 1140 operates independently of the transmission. On the 1120, the PTO shafts are transmission-driven with "live" PTO as an option.

The new L106 and L108 front-end loader models also are available.

A choice of hydrostatic or gear transmissions is available for all 1100 Series models. The gear transmission is partially synchronized on the 1120 with a first-gear/reverse shuttle for close work. On the 1130 and 1140, gear transmissions are fully synchronized. A speed set lever is available as part of the hydrostatic transmission option.

J I Case also is offering backhoes, rotary tillers and box scrapers designed to work with Case International compact tractors.

"Case has designed the new M160 mid-mounted, shaft-driven mowers to provide more than 5 inches of ground clearance with the 1100 Series tractors," Rabe says. Rear-mounted mowers are also available. A choice of mower sizes and arrangements are offered because what fits some conditions may not be right for others.

The new L106 and L108 front-end loader models also have been designed especially for the 1100 Series tractors.

The new attachments expand the Case International line of implements for compact tractors.

H180 and H185 backhoes feature strong steel subframes. The arm on both models rotates 180 degrees for work in confined areas. "For responsiveness, a two-lever control valve with access controls is mounted directly on the hydraulic valve. A dedicated valve allows simultaneous functioning of two backhoe modes," Rabe says.

Case International rotary tillers feature skid shoes, an adjustable rear shield and speed blades. All tillers offer a slip-clutch driveshaft as standard equipment.

Maximum tilling depth is 5.5 inches for all the tillers. For different applications, the tillers feature different numbers of blades. The T140 has 24 blades, the T152 has 32 blades and the T160 has 38 blades, based on the width of the models.

Case International box scrapers feature hardened steel edges that are both reversible and replaceable. The 48-inch S148 is fitted with four shanks, the 60-inch S160 with five, and the 72-inch S172 with six. □

CASE

(From pg. 9)

straight up and a conveyor chain unloads the cotton. Because the basket does have to be tilted, operators can position the picker more easily along a module builder or trailer. The weight of the basket is still centered on the picker itself during unloading, and operators have complete command of the unloading because the conveyor chain can be started or stopped at any time.

Both pickers have maximum picker speeds of 3.5 mph to enable harvesting time close to 10 percent faster than previous pickers.

The 4-row 2044 is powered by a 225-hp Case International diesel engine, while the 2022 is equipped with a 160-hp engine. The Cotton Express will be available at dealers by March 1991, although Kosten said many orders for the equipment are already being filled. □

C3450-1

REMODELING THE SHOWROOM PAGE 6

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, No. 2 FEBRUARY 1991

Lawsuit Teaches Valuable Lessons

By Scott Nesbitt

"The lady got hurt when she flipped the tractor. She admitted they made a mistake. That was before they saw a lawyer."

EDITOR'S NOTEBOOK

LAST month's "Editor's Notebook" touched some nerves with dealers over the issue of safety, liability and insurance settlements, and resulted in a fascinating phone call.

The caller said he was the dealer Ford New Holland referred to in a full-page I&T advertisement that talked about an "equipment dealer from the Southwest who settled out of court for over 1 million dollars."

The ad said the dealer "thought he could save a customer a few hundred by selling a used tractor without ROPS. He won't do that again."

That isn't exactly the situation, said the caller.

The story, as he told it, is even more chilling from the standpoint of any dealer who handles any used, or new, machinery.

Before getting into this, understand that in 2 decades in the news business, I've never before used material from a person without knowing his name. In this case, I made an exception because the caller sounded

(See NOTEBOOK, pg. 3)

OPEI Sees Downturn For 1991

OPEI's Economic Forecast for outdoor power equipment has been revised to reflect current national economic conditions.

Due to indications of recession and rising unemployment, consumers are staying away from the housing market and the purchase a big-ticket items. The sale of outdoor power equipment, as well as other durable goods, is strongly affected by housing starts and resales.

Shipments of walk-behind powered mowers, front engine lawn tractors, and riding garden tractors are all expected to decrease in the 1991 model year. However, increased shipments in these categories are forecasted for the model year 1992.

A more optimistic outlook for rear engine riders is predicted with 14.1 percent and 2.8 percent increases in shipments for the 1991 and 1992 model years respectively.

A new category for tillers has been added in an effort to expand the scope of the forecast. ☐

(See Table On Page 10)

KUBOTA
KUBOTA
COMMERCIAL
COMMERCIAL

KUBOTA'S RON CROUSE pointed out the benefits of his firm's walk-behind bagging mower during last year's International Lawn, Garden and Power Equipment Expo. Kubota, best known for tractors, is one of many equipment manufacturers making a commitment to the development of improved products for the turf industry. For an update on what's new in mowers, see page 8.

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Outdoor Power Equipment Emphasis

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

FEBRUARY 1991
VOL. 106, NO. 2

IMPLEMENT & TRACTOR
Editorial, advertising and circulation correspondence should be addressed to: P.O. Box 1420, Clarksdale, Mississippi 38614.
Telephone: 601/624-8503

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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years — $30. Single copies, $2.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953 $2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

NOTEBOOK—

(From pg. 1)

very legitimate. He knew details about the case I had also heard from FNH people and others involved in it.

The story begins with the purchase of a 1957 Ford tractor from the dealership by a young couple. The husband was experienced with using tractors, the wife was not. The tractor was in average condition for something with 30-plus years on it.

My caller says that when the tractor left the dealership, it carried a "postage-stamp" sized decal at the rear end. This critical little decal warns the tractor operator not to pull loads with the top link of the 3-point hitch.

The decal, said my caller, was covered up when the tractor was repainted. The tractor's owners, not the dealership, repainted the tractor.

The couple put their repainted tractor to work pulling stumps or some comparable load-hauling. The tractor left the dealership equipped with a drawbar, but for some reason, said my caller, the couple attached their pulling chain to the top link, rather than the drawbar.

The tractor flipped.

"The woman was driving, and she admitted she didn't have much experience on a tractor," said my caller. "She was in the shop 2 days later with stitches in her head and told all about it. She said, 'we knew better than to do that.' "

It took a few months for the couple to start legal action as a result of the injury and accident. My caller said he understood the couple had gone to talk to the lawyer about another matter, but somehow ended up with the notion of seeking compensation for the injury. It is sheer speculation as to whether the lawyer suggested that action.

The case, said my caller, was taken to a county where "we had no possibility of winning," given the track record of courts and juries in that court district. Insurance company attorneys handled the case for the dealer.

Initially, my caller said, the matter was going to be settled out of court for $500,000, but the insurance company lawyers disclosed that the dealership had a $1 million umbrella liability policy. That resulted in the damages sought suddenly rising to $1.5 million.

"They finally settled for a $1.1 or $1.2," said my caller. "I understand that after they settled with us, they came back and took a swipe at Ford, but I'm not sure how that turned out."

My caller said he's been a dealer since the end of World War II, "and this was the first time I'd ever been sued. We had always tried to play it safe with equipment, tried to do the right thing, but it's getting more treacherous out there all the time."

My caller didn't agree with the statement in the FNH ad about saving a customer a "few hundred dollars."

"There wouldn't have been a sale if we'd installed a roll bar," said the caller. "It was a $1,700 roll bar and it was a $3,000 tractor. The buyer didn't want it. We mentioned it, but he didn't want it."

The caller commented that the situation revolved around the safety decal, which he called "a flimsy piece of paper."

"If a safety warning is so important," he argued, "it would seem manufacturers would put it on a metal plate that could still be read after a tractor is repainted."

The subject of farm machinery safety, he said, seems to get short shrift in the general scheme of things, he said.

"I had a high school class in here and asked them if they had safety decals on their tractors back home. Only 2 of them were familiar with what those decals said. The rest didn't know they were there or what they said."

My caller said he expected the out-of-court settlement between the injured woman and the insurance company was going to double the dealership's insurance premiums, which stood at $13,339 a year now. He noted that he was not able to force the case to be heard before a judge and/or a jury, because the insurance attorneys decided to settle out of court. But he will end up paying the higher premiums.

The caller said he tried to do the right things. He offered the customer a roll bar, but the only one he knew of being available for that machine cost more than half the asking price of the used tractor, and the customer rejected it. He says he heard the injured party say she was at fault. He also said that he had the customers sign a card that said they were familiar with safe operation of the tractor and that the machine was delivered in safe operating condition.

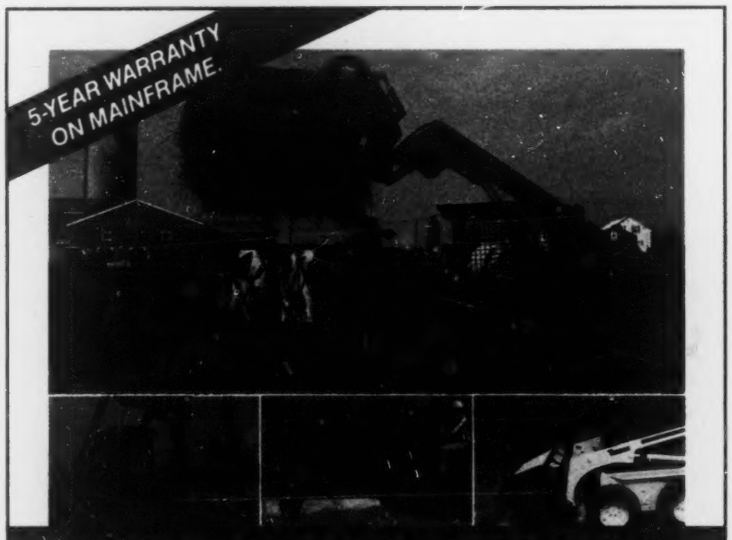
"I was told that would not have meant anything in court," he said.

What's a dealer to do? Get out of the business? Stop selling any used equipment, or maybe only sell equipment less than 5 years old?

My caller said his best solution so far is "I take pictures of everything that goes out of here."

He pulls out a Polaroid instant camera and gives the customer all the safety books that were supposed to come with the tractor, plus some others that didn't come from the original manufacturer.

"I get him to stand at the rear, where all the safety decals are, and I take his picture, with him holding all the books. I use the instant camera because I want to make sure I have the picture. Then I put it in a file, with all the other things from that sale, and hope I never have to pull it out of there again." ☐



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Circle (3) on Reply Card

1990's Sales Figures: Not All That Bad

WHILE 1990 sales tractor sales totals were almost the same at 1989's, there were substantial increases in larger 2wd classes and in the 4wd category. The Equipment Manufacturers Institute also reported that combine sales were up 14.5 percent over the previous year. For December, a whopping 46.3 percent rise was seen in the 100-hp and over 2wd tractor category.

In sum, sales began well in 1990, slumped after the early-August Gulf hostilities flared, then began creeping back up. But weakness persisted in the under-40-hp category, a segment that generally rises and falls with the housing market, rather than agricultural markets. ☐

U.S. - UNIT RETAIL SALES

	December			January-December			November 1990 Inventory
Equipment	1990	1989	% Change	1990	1989	% Change	N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	2,194	2,401	(8.6)	42,040	46,923	(10.4)	41,056
40 & Under 100 HP	2,853	2,633	8.4	38,411	34,905	10.0	25,137
100 HP & Over	3,575	2,443	46.3	22,797	20,595	10.7	16,030
Total 2-Wheel Drive	8,622	7,477	15.3	103,248	102,423	.8	82,223
Total 4-Wheel Drive	433	385	12.5	5,102	4,152	22.9	2,561
Total Farm Wheel Tractors	9,055	7,862	15.2	108,350	106,575	1.7	84,784
Combines: (Self-Propelled)	1,082	1,012	6.9	10,432	9,110	14.5	5,121

These data are, in part, estimates which are subject to revisions when final detail data become available. Because of the seasonal nature of the industry comparisons of monthly data from one period to another should be done with extreme caution. These data represent most, but not all, of the manufacturers in each product category being sold at retail in the fifty states and the District of Columbia.

Blout Inc. Reports $4.2 Million Net Income

Blount, Inc. has reported net income of $4.2 million ($.35 per share) for the third quarter ended Nov. 30, 1990. This compares to net income of $3.4 million ($.28 per share) during last year's third quarter.

This year's results include a $1.2 million ($.10 per share) after-tax extraordinary gain from the repurchase of $13.8 million of the company's subordinated notes. Last year's results included a $.5 million ($.04 per share) net loss from discontinued operations. Third quarter sales and revenues were $185.2 million compared to $165.2 million last year.

For the 9 month period ended Nov. 30, Blount reported net income of $4.2 million ($.35 per share), compared to net income of $12.8 million ($1.06 per share) in the prior fiscal year's 9 month period. Last year's 9 month results included $6.4 million ($.53 per share) income from the resolution of tax matters principally related to foreign tax credits and royalties and a $2.9 million ($.24 per share) loss from discontinued operations. Year-to-date sales and revenues were $528.9 million, compared to $528.2 million in the prior year.

R. William Van Sant, Blount, Inc. President and Chief Executive Officer, said, "We are generally pleased with the quarter's results, especially given the state of the economy and current situation in the Persian Gulf. Our emphasis during the balance of the year will be to minimize the impact of a softening economy while maintaining longer-term programs for growth and building value."

The Outdoor Products segment reported operating income of $8.6 million and sales of $55.9 million, compared to $7.9 million in operating income and $47.1 million sales in last year's third quarter. Nine month operating income was $14.9 million compared to $15.1 million last year while sales increased to $143.1 million from $125.1 million the prior year.

Operating income from Industrial and Power Equipment was $.9 million compared to $1.6 million last year. Sales were $22 million compared to $24.5 million last year. For the 9 month period sales were $68.0 million and operating income was $2.8 million compared to last year's sales of $69.3 million and operating income of $3.2 million. Current year results reflect lower order levels due to economic conditions affecting the operation's principal markets, particularly pulp/paper and forestry products. ☐

BRIEFLY...

The updated 1990-1991 membership directory is now available from the Outdoor Power Equipment Distributors Association, 1900 Arch St., Philadelphia, Pa., 19103.

Gates, Dodge Sign Agreement

The Gates Rubber Company and Dodge of Reliance Electric have signed an agreement to share manufacturing capacity of industrial belt sheaves, pulleys, sprockets and bushings.

The agreement was effective Jan. 10 and includes the North American operations of both companies.

According to Al Stoner, Gates senior vice president, power transmission division, and Joseph D. Swann, Dodge vice president and general manager, the alliance offers several benefits for power transmission distributors and their customers.

First, the alliance means that these leading manufacturers will provide long-term stability and a greater commitment to the marketplace, "which has seen considerable turmoil," says Stoner.

Second, the alliance, says Swann, "will utilize Dodge World Class Manufacturing Techniques to efficiently produce sheaves, pulleys, and synchronous sprockets and bushings for both companies."

Both companies stressed that the alliance is a joint utilization of manufacturing capabilities, not a merger or buy-out. ☐

Economic Forecast For OPEI

This summary information is extracted from the Outdoor Power Equipment Institute's (OPEI) Economic Forecast for the Outdoor Power Equipment Industry dated December 19,1990 which represents an update of the August, 1990 Forecast. The complete forecast, based on an econometric model developed by Association Research, Inc. (ARI), provides unit shipments data, by quarters, for each of the five major OPE segments: Walk-Behind Power Mowers; Rear Engine Riding Mowers; Front Engine Lawn Tractors; Riding Garden Tractors; Tillers.

Additionally, information provided to the OPEI membership includes a comprehensive discussion of assumptions about the U.S. economy and their relationship to the outdoor power equipment industry.

The table provided below shows the forecast for OPEI model years 1991 (September, 1990-August 1991) and 1992 (September, 1991-August, 1992). Percent changes are based on comparison of current year to previous year. For example, the shipments of walk-behind mowers for the 1991 model year are expected to be 7.4 percent lower than 1990.

MODEL YEAR BASIS (Sep-Aug)

	ACTUAL							FORECAST	
	1984	1985	1986	1987	1988	1989	1990	1991	1992
UNIT SHIPMENTS									
Walk-Behind Powered Mowers	4,950,000	5,193,000	5,400,000	5,900,000	5,600,000	5,300,000	5,700,000	5,277,399	5,418,479
Percent Change	12.5%	4.9%	4.0%	9.3%	-5.1%	-5.4%	7.5%	-7.4%	2.7%
Rear Engine Riding Mowers	354,000	355,000	322,000	375,000	375,000	260,000	247,000	281,718	289,716
Percent Change	28.3%	0.3%	-9.3%	16.5%	0.0%	-30.7%	-5.0%	14.1%	2.8%
Front Engine Lawn Tractors	502,000	548,000	623,000	800,000	812,000	792,999	885,000	841,014	977,818
Percent Change	21.0%	9.2%	13.7%	28.4%	1.5%	-2.3%	11.6%	-5.0%	16.3%
Riding Garden Tractors	152,000	147,000	149,000	150,000	170,000	139,000	156,000	151,460	169,918
Percent Change	17.8%	-3.3%	1.4%	0.7%	13.3%	-18.2%	12.2%	-2.9%	12.2%
All Riding Units	1,008,000	1,050,000	1,094,000	1,325,000	1,357,000	1,191,999	1,288,000	1,274,191	1,437,452
Percent Change	22.9%	4.2%	4.2%	21.1%	2.4%	-12.2%	8.1%	-1.1%	12.8%
Tillers	399,000	362,000	311,000	272,000	285,000	305,000	300,000	282,730	269,026
Percent Change	5.6%	-9.3%	-14.1%	-12.5%	4.8%	7.0%	-1.6%	-5.8%	-4.8%

March 31, 1991
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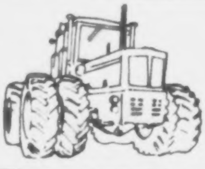

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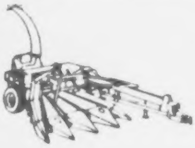

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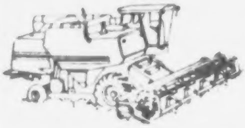

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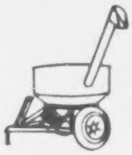

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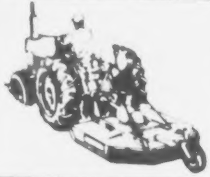

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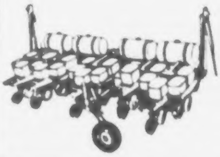

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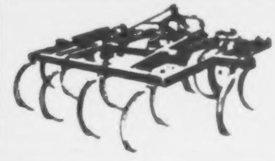

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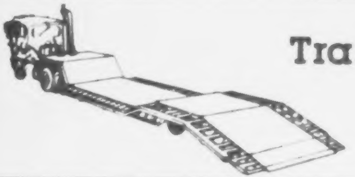

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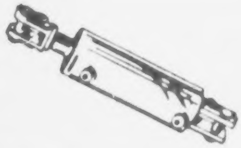

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Std. – Standard.
Opt. – Optional.
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Tommy L. Keith, President and Publisher

Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years —$30. Single copies, $3.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions.

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ISSN 0019-2953 $8.00 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Mississippi, and additional mailing offices. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Mississippi 38614.

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Nebraska Test Procedures

General

Tractors are tested at the University of Nebraska according to the Agricultural Tractor Test Code approved by the American Society of Agricultural Engineers and the Society of Automotive Engineers or official Nebraska test procedure.

The manufacturer selects the tractor to be tested and certifies that it is a stock model. Each tractor is equipped with the common power consuming accessories such as power steering, power lift pump, generator, etc., if available. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operating station. An official representative of the company is present during the test to see that the tractor gives its optimum performance. Additional weight may be added to the tractor as ballast if the manufacturer recommends use of such ballast. The static tire loads and the tire inflation pressures must conform to the specifications of Tire and Rim Association.

Preparation for Test

The engine crankcase is drained and refilled with new oil conforming to specifications in the operator's manual. The operator's manual is also used as the guide for selecting the proper fuel and for routine lubrication and maintenance operations.

The tractor is limbered up for a minimum of three hours on the drawbar. Preliminary adjustments of the tractor is permitted at this time. Any parts added or replaced during the limber-up run, or any subsequent runs, are mentioned in the individual test reports. The tractor is equipped with approximately the amount of added ballast that is to be used during the drawbar runs.

PTO Performance

Power take-off performance runs are made by connecting the power take-off to a dynamometer. During a preliminary power take-off the manufacturer's representative may make adjustment for the fuel, ignition or injection timing and governor control settings. The settings must be maintained for the remainder of the test. The manually operated governor control mechanism is set to provide the high-idle speed specified by the manufacturer. During the power take-off runs an ambient air temperature of approximately 75 degrees F. (24.0 degrees C) is maintained.

Maximum power is obtained at the rated engine speed specified by the manufacturer with the governor control set for maximum power. This same setting is used for all subsequent PTO runs. Time of the run is two hours. Whenever the power take-off speed during the maximum power run differs from the speeds set forth in the ASAE and SAE standards, an additional run is made at either 540 or 1000 rpm of the power take-off shaft. Time of this run is one hour.

Drawbar Performance

Maximum drawbar power is shown for the normal field speed selected by the manufacturer. All engine adjustments are the same as those used in the power take-off runs. If the manufacturer specifies a different rated engine speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified.

Maximum drawbar power is determined within the following limits: (1) slip of the drivers must not exceed 15 percent for pneumatic tires on the concrete test course or 7 percent for steel cleats on the well packed earthen course; (2) ground speeds must not exceed 10 miles per hour; (3) safe stability limits of the tractor must not be exceeded; (4) no other operating limit of the tractor must be exceeded. Drawbar load is applied until the manufacturer's rated engine speed is obtained with maximum governor control lever setting. Travel speed, drawbar pull and other data are recorded over two 500-foot straight level areas.

Fuel consumption is determined at the manufacturer's selected travel speed with the drawbar pull set: (1) to give rated engine rpm; (2) 75 percent of the pull at rated engine rpm; (3) 50 percent of the pull at rated engine rpm; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

This summary shows the drawbar horsepower, corresponding travel speed and duel consumption at 100 percent, 75 percent, or 50 percent loads, and 50 percent of pull at reduced engine speed.

Also shown is the maximum drawbar horsepower produced for two 500-foot travel sections and corresponding travel speed, the maximum drawbar pull and the corresponding drive-wheel slippage.

In addition, the "lugging ability" obtained by increasing the load so that the full throttle engine speed drops to 80 percent of rated is given as a percent increase with respect to the pull at rated engine rpm.

The maximum drawbar horsepower and the corresponding speed and drawbar pull for other selected gears or travel speeds are shown in the individual test reports.

Sound Measurement

Sound is recorded during each of the Drawbar Performance runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet (7.5 meters) from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

SUMMARY OF OECD TEST 1218—NEBRASKA SUMMARY 074
CASE INTERNATIONAL 1896 DIESEL
12 SPEED
(CHASSIS S/N *178955122* and Higher)

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Fuel Consumption Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1000 rpm)					
101.6 (75.8)	2105	5.75 (21.78)	0.396 (0.241)	17.66 (3.48)	
Maximum Power (2 Hours)					
104.5 (77.9)	1879	5.69 (21.55)	0.381 (0.232)	18.32 (3.61)	
VARYING POWER AND FUEL CONSUMPTION					
101.6 (75.8)	2105 —	5.75 (21.78)	0.396 (0.241)	17.66 (3.48)	Air temperature
88.1 (65.7)	2145	5.19 (19.64)	0.411 (0.250)	17.00 (3.35)	81°F (27°C)
66.9 (49.9)	2165	4.37 (16.55)	0.457 (0.278)	15.33 (3.02)	Relative humidity
45.2 (33.7)	2194	3.54 (13.41)	0.547 (0.333)	12.74 (2.51)	17%
22.5 (16.8)	2227	2.69 (10.18)	0.835 (0.508)	8.38 (1.65)	Barometer
0 (0)	2252	1.94 (7.34)	— —	— —	30.42" Hg (103 kPa)

Maximum Torque 365.6 lb.-ft. (495.7 Nm) @ 1202 RPM
Maximum Torque Rise 24.6%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lb (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—4th (3-1) Gear									
77.9 (58.1)	5890 (26.2)	4.96 (7.99)	2100	2.5	0.554 (0.337)	13.10 (2.58)	183 (84)	54 (12)	30.21 (102.3)
75% of Pull at Maximum Power—4th (3-1) Gear									
57.9 (43.2)	4205 (18.7)	5.16 (8.31)	2175	1.9	0.580 (0.353)	12.05 (2.37)	185 (85)	54 (12)	30.21 (102.3)
50% of Pull at Maximum Power—4th (3-1) Gear									
41.0 (30.6)	2945 (13.1)	5.23 (8.42)	2190	1.5	0.700 (0.426)	10.00 (1.97)	183 (84)	54 (12)	30.21 (102.3)
75% of Pull at Reduced Engine Speed—7th (2-3) Gear									
57.9 (43.2)	4205 (18.7)	5.18 (8.33)	1956	1.9	0.546 (0.332)	12.64 (2.49)	180 (82)	52 (11)	30.21 (102.3)
50% of Pull at Reduced Engine Speed—7th (2-3) Gear									
40.9 (30.5)	2945 (13.1)	5.23 (8.42)	1966	1.5	0.639 (0.389)	10.91 (2.15)	180 (82)	54 (12)	30.21 (102.3)

Location of Test: AFRC Institute for Engineering Research, Wrest Park, Silsoe, Bedford, England MK45 4HS

Dates of Test: February-April, 1989

Manufacturer: J. I. CASE EUROPE Limited, Wheatley Hall Road, Doncaster, South Yorkshire, England DN2 4PG

FUEL AND OIL: Fuel No. 2 Diesel **Cetane No.** NA **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8380 **Fuel weight** 6.977 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W40 **Oil consumption for 10 hours** NA **Transmission and hydraulic lubricant** International Hytran fluid **Front axle lubricant** SAE 90 EP

ENGINE: Make Consolidated Diesel Corporation-Case Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 210 55 34 1 **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.016" × 4.724" *(102.0 mm × 120.0 mm)* **Compression ratio** 17.5 to 1 **Displacement** 359 cu in *(5883 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat

CHASSIS: Type front wheel assist **Serial No.** *178955122* **Tread width** rear 62.0" *(1574 mm)* to 82.7" *(2100 mm)* front 60.0" *(1524 mm)* to 89.0" *(2261 mm)* **Wheel base** 108.7" *(2760 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.95 *(3.14)* second 2.60 *(4.18)* third 3.25 *(5.23)* fourth 3.32 *(5.34)* fifth 4.42 *(7.12)* sixth 4.98 *(8.02)* seventh 5.53 *(8.90)* eighth 6.64 *(10.68)* ninth 8.30 *(13.35)* tenth 10.13 *(16.31)* eleventh 13.51 *(21.74)* twelfth 16.89 *(27.18)* reverse 3.25 *(5.23)*, 5.53 *(8.90)* 8.30 *(13.35)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 1000 rpm at 2105 engine rpm and 540 rpm at 2125 engine rpm **Unladen tractor mass** 13105 lb *(5944 kg)*

DRAWBAR PERFORMANCE
MAXIMUM POWER IN SELECTED GEARS

2nd (1-2) Gear									
78.3 (58.4)	12475 (55.5)	2.36 (3.79)	2101	15.0	0.536 (0.326)	13.05 (2.57)	183 (84)	50 (10)	30.21 (102.3)
3rd (1-3) Gear									
85.4 (63.7)	11144 (49.6)	2.86 (4.61)	1904	6.8	0.482 (0.293)	14.52 (2.86)	181 (83)	50 (10)	30.21 (102.3)
4th (2-1) Gear									
85.9 (64.1)	11285 (50.2)	2.85 (4.56)	1884	6.6	0.483 (0.294)	14.45 (2.85)	183 (84)	50 (10)	30.21 (102.3)
5th (2-2) Gear									
85.4 (63.7)	8205 (36.5)	3.90 (6.28)	1884	3.3	0.478 (0.291)	14.60 (2.88)	181 (83)	50 (10)	30.21 (102.3)
6th (3-1) Gear									
87.5 (65.3)	7420 (33.0)	4.42 (7.11)	1878	3.3	0.498 (0.303)	14.02 (2.76)	183 (84)	52 (11)	30.21 (102.3)
7th (2-3) Gear									
86.6 (64.6)	6610 (29.4)	4.92 (7.91)	1879	2.8	0.470 (0.286)	14.85 (2.93)	183 (84)	52 (11)	30.21 (102.3)
8th (3-2) Gear									
84.8 (63.2)	5570 (24.8)	5.72 (9.20)	1876	2.3	0.482 (0.293)	14.52 (2.86)	183 (84)	54 (12)	30.21 (102.3)
9th (3-3) Gear									
82.7 (61.7)	4160 (18.5)	7.46 (12.00)	1885	1.8	0.492 (0.299)	14.21 (2.80)	183 (84)	54 (12)	30.21 (102.3)

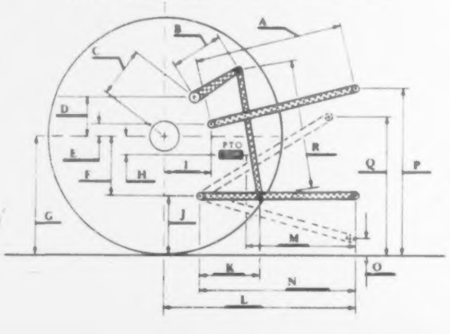
TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum sound level	78.0
Bystander	N.A.

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4R38; [illegible]
Front Tires	—No., size, ply & psi (kPa)	Two 14.9R28; [illegible]
Height of Drawbar		[illegible] in ([illegible] mm)
Static Weight	—Rear	8645 lb (3921 kg)
	—Front	4460 lb (2023 kg)
	—Total	13105 lb (5944 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY II	
Quick Attach: None	
Maximum Force Exerted Through Whole Range	5710 lbs (25.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure at open relief valve	2275 psi (157 Bar)
ii) Pump delivery rate at minimum pressure	23.6 GPM (89.3 l/min)
iii) Pump delivery rate at maximum hydraulic power	23.0 GPM (87.0 l/min)
Delivery pressure	1770 psi (122 Bar)
Power	23.7 Hp (17.7 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD



	inch	mm
A	22.9	581
B	12.0	305
C	14.6	372
D	13.1	333
E	3.2	81
F	12.4	315
G	32.3	820
H	4.4	112
I	20.2	514
J	19.9	505
K	17.1	434
L	42.7	1084
*M	20.5	521
N	30.1	765
O	7.9	200
P	40.0	1015
Q	32.5	825
R	34.4	875

*to 1000 rpm shaft

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. This tractor did not meet manufacturer's 3 point lift capacity claim of 6600 lbs *(2994 kg)*. The performance figures on this summary apply to chassis S/N *178955122* and up. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true summary of data from OECD Report No. **1218**, Nebraska Summary 074, May 24, 1990.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1617—SUMMARY 055
JOHN DEERE 4055 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
109.18 (81.42)	2200	6.65 (25.16)	0.425 (0.258)	16.42 (3.24)	
Maximum Power (2 Hours)					
113.27 (84.47)	1950	6.43 (24.34)	0.398 (0.242)	17.46 (3.44)	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
109.18 (81.42)	2200	6.65 (25.16)	0.425 (0.258)	16.42 (3.24)	76°F (24°C)
97.25 (72.52)	2301	6.38 (24.15)	0.453 (0.276)	15.24 (3.00)	Relative humidity
73.50 (54.81)	2328	5.43 (20.54)	0.510 (0.310)	13.54 (2.67)	[illegible]
49.31 (36.77)	2347	4.47 (16.92)	0.627 (0.381)	11.03 (2.17)	Barometer
24.86 (18.54)	2365	3.43 (12.98)	0.953 (0.580)	7.25 (1.43)	29.02" Hg (98.26 kPa)
0.38 (0.28)	2383	2.47 (9.36)	45.315 (27.564)	0.15 (0.03)	

Maximum Torque 347 lb.-ft. (471 Nm) at 1200 rpm
Maximum Torque Rise 33.3%
Torque Rise at 1800 engine rpm 31%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th Gear									
92.79 (69.19)	7848 (34.91)	4.43 (7.14)	2201	5.32	0.495 (0.301)	14.02 (2.76)	185 (85)	70 (21)	28.93 (97.97)
75% of Pull at Maximum Power—7th Gear									
74.12 (55.27)	5889 (26.19)	4.72 (7.60)	2321	2.26	0.554 (0.337)	12.47 (2.46)	182 (83)	70 (21)	28.92 (97.93)
50% of Pull at Maximum Power—7th Gear									
50.14 (37.39)	3923 (17.45)	4.79 (7.71)	2339	1.60	0.666 (0.405)	10.37 (2.04)	180 (82)	70 (21)	28.92 (97.93)
75% of Pull at Reduced Engine Speed—9th Gear									
74.14 (55.29)	5886 (26.18)	4.72 (7.60)	1799	2.34	0.491 (0.299)	14.08 (2.77)	182 (83)	70 (21)	28.90 (97.87)
50% of Pull at Reduced Engine Speed—9th Gear									
50.20 (37.43)	3929 (17.48)	4.79 (7.71)	1811	1.60	0.560 (0.341)	12.33 (2.43)	179 (82)	70 (21)	28.90 (97.87)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: April-May, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 3.555 gal *(13.456 l)* **Drained from motor** 3.478 gal *(13.165 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 23.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T102415* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 44.1-48.2 lb/hr *(20.0-21.8 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 10-13 psi *(69-90 kPa)* as measured 10.0 psi *(69 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW4055P001009* **Tread width** rear 62.0" *(1574 mm)* to 110.2" *(2800 mm)* front 60.6" *(1538 mm)* to 88.0" *(2235 mm)* **Wheel base** 105.3" *(2675 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.41 *(2.27)* second 2.02 *(3.25)* third 2.38 *(3.83)* fourth 3.06 *(4.93)* fifth 3.53 *(5.68)* sixth 4.01 *(6.45)* seventh 4.61 *(7.43)* eighth 5.17 *(8.32)* ninth 5.96 *(9.58)* tenth 6.76 *(10.88)* eleventh 7.79 *(12.53)* twelfth 8.94 *(14.38)* thirteenth 11.06 *(17.80)* fourteenth 15.08 *(24.27)* fifteenth 18.65 *(30.02)* reverse 1.72 *(2.76)*, 2.46 *(3.96)*, 3.73 *(6.01)*, 5.62 *(9.05)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 13955 lb *(6330 kg)*

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
78.06 (58.21)	13981 (62.19)	2.09 (3.37)	2285	13.90	0.585 (0.356)	11.82 (2.33)	179 (82)	54 (12)	29.03 (98.31)
4th Gear									
90.97 (67.83)	12361 (54.98)	2.76 (4.44)	2143	6.87	0.503 (0.306)	13.74 (2.71)	179 (82)	45 (7)	29.04 (98.34)
5th Gear									
93.93 (70.04)	12183 (54.19)	2.89 (4.65)	1948	6.80	0.478 (0.291)	14.45 (2.85)	183 (84)	61 (16)	29.02 (98.27)
6th Gear									
95.52 (71.23)	10712 (47.65)	3.34 (5.38)	1952	5.21	0.470 (0.286)	14.69 (2.89)	184 (84)	63 (17)	29.01 (98.24)
7th Gear									
96.51 (71.97)	9283 (41.29)	3.90 (6.27)	1952	4.05	0.466 (0.284)	14.82 (2.92)	186 (85)	70 (21)	28.92 (97.93)
8th Gear									
94.24 (70.27)	8039 (35.76)	4.40 (7.08)	1950	3.48	0.475 (0.289)	14.55 (2.87)	185 (85)	70 (21)	28.93 (97.97)
9th Gear									
94.37 (70.37)	6954 (30.93)	5.09 (8.19)	1948	2.83	0.474 (0.288)	14.59 (2.87)	185 (85)	70 (21)	28.94 (98.00)
10th Gear									
93.33 (69.59)	6023 (26.79)	5.81 (9.35)	1953	2.42	0.482 (0.293)	14.34 (2.83)	184 (84)	65 (18)	28.99 (98.17)
11th Gear									
93.54 (69.75)	5227 (23.25)	6.71 (10.80)	1950	2.10	0.481 (0.293)	14.37 (2.83)	184 (84)	68 (20)	28.97 (98.10)
12th Gear									
95.90 (71.51)	4651 (20.69)	7.72 (12.42)	1947	1.77	0.467 (0.284)	14.79 (2.91)	185 (85)	70 (21)	28.96 (98.07)
13th Gear									
92.69 (69.12)	3622 (16.11)	9.60 (15.44)	1951	1.43	0.483 (0.294)	14.32 (2.82)	184 (84)	70 (21)	28.95 (98.04)

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
78.09 (58.23)	13950 (62.05)	2.10 (3.38)	2286	14.34	0.585 (0.356)	11.81 (2.33)	179 (82)	51 (11)	29.03 (98.31)
4th Gear									
89.82 (66.98)	11764 (52.33)	2.86 (4.61)	2201	5.74	0.510 (0.310)	13.55 (2.67)	180 (82)	48 (9)	29.04 (98.34)
5th Gear									
91.33 (68.11)	10243 (45.56)	3.34 (5.38)	2202	4.58	0.504 (0.306)	13.72 (2.70)	182 (83)	60 (16)	29.02 (98.27)
6th Gear									
91.73 (68.42)	9023 (40.13)	3.81 (6.14)	2198	3.95	0.499 (0.304)	13.85 (2.73)	182 (83)	62 (17)	29.01 (98.24)
7th Gear									
92.79 (69.19)	7848 (34.91)	4.43 (7.14)	2201	5.32	0.495 (0.301)	14.02 (2.76)	185 (85)	70 (21)	28.93 (97.97)
8th Gear									
90.23 (67.29)	6785 (30.18)	4.99 (8.03)	2199	2.75	0.508 (0.309)	13.62 (2.68)	184 (84)	70 (21)	28.93 (97.97)
9th Gear									
89.69 (66.88)	5826 (25.91)	5.77 (9.29)	2199	2.34	0.508 (0.309)	13.59 (2.68)	184 (84)	70 (21)	28.94 (98.00)
10th Gear									
89.28 (66.58)	5087 (22.63)	6.58 (10.59)	2202	2.01	0.510 (0.310)	13.54 (2.67)	182 (83)	70 (21)	28.95 (98.04)
11th Gear									
87.33 (65.12)	4310 (19.17)	7.60 (12.23)	2200	1.68	0.522 (0.317)	13.24 (2.61)	183 (84)	66 (19)	28.98 (98.14)
12th Gear									
89.98 (67.10)	3862 (17.18)	8.74 (14.06)	2201	1.52	0.511 (0.311)	13.53 (2.67)	183 (84)	69 (21)	28.96 (98.07)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 122° F *(50° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb *(2971 kg)* or 8470 lb *(3842 kg)* with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1617**, Summary 055, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	74.5
Maximum sound level	75.8
Transport speed—no load—15th Gear	77.0
Bystander in 15th Gear	87.0

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2202	1979	1757	1541	1320	1101
Pull—lbs (kN)	5087 (22.63)	5961 (26.52)	6457 (28.72)	6892 (30.66)	7041 (31.32)	7029 (31.27)
Increase in Pull %	0	17	27	35	38	38
Power—Hp (kW)	89.28 (66.58)	93.63 (69.82)	89.83 (67.00)	83.96 (62.61)	73.36 (54.71)	61.12 (45.58)
Speed—Mph (km/h)	6.58 (10.59)	5.89 (9.48)	5.22 (8.40)	4.57 (7.35)	3.91 (6.29)	3.26 (5.25)
Slip %	2.01	2.34	2.51	2.83	2.99	2.83

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2560 (176)
Location	remote outlet
Hydraulic oil temperature °F(°C)	142 (61)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6526 (29.0)	6175 (27.5)

with lift assist cylinder

Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8635 (38.4)	8077 (35.9)

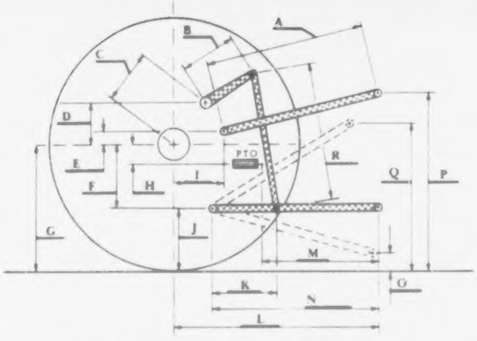
TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4R38; **; 16 (110)
Front Tires	—No., size, ply & psi (kPa)	Two 14.9R26; ***; 30 (205)
Height of Drawbar		17.0 in (430 mm)
Static Weight	—Rear	8580 lb (3892 kg)
	—Front	5375 lb (2438 kg)
	—Total	13955 lb (6330 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: II
Quick Attach: None

Maximum Force Exerted Through Whole Range	5504 lbs (24.5 kN) *7281 lbs (32.4 kN)
i) Opening pressure of relief valve	N.A.
Sustained pressure with pump stalled	2560 psi (176 Bar)
ii) Pump delivery rate at minimum pressure	27.0 GPM (102.2 l/min)
iii) Pump delivery rate at maximum hydraulic power	26.1 GPM (98.8 l/min)
Delivery pressure	2100 psi (145 Bar)
Power	32.0 Hp (23.8 kW)

*with lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	(mm)
A	26.6	(676)
B	11.5	(292)
C	11.3	(287)
D	10.9	(278)
E	5.5	(140)
F	10.2	(259)
G	33.1	(842)
H	6.5	(165)
I	13.5	(343)
J	22.9	(582)
K	23.1	(587)
L	41.2	(1046)
M	21.6	(549)
N	—36.7	(932)
O	8.3	(211)
P	43.0	(1092)
Q	35.5	(902)
R	32.8	(833)

4055
JOHN DEERE

John Deere 4055 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1618—SUMMARY 056
JOHN DEERE 4255 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
123.36 (91.99)	2200	7.34 ([illegible])	0.411 (0.250)	16.81 ([illegible])	
Maximum Power (2 Hours)					
126.68 (94.46)	2088	7.24 ([illegible])	0.397 ([illegible])	17.51 ([illegible])	
VARYING POWER AND FUEL CONSUMPTION					
123.36 (91.99)	2200	7.34 ([illegible])	0.411 ([illegible])	16.81 ([illegible])	Air temperature
107.57 (80.21)	2260	6.81 ([illegible])	0.438 ([illegible])	15.79 ([illegible])	Relative humidity
82.02 (61.16)	2292	5.79 ([illegible])	0.487 ([illegible])	14.32 ([illegible])	
55.42 (41.33)	2325	4.60 ([illegible])	0.585 ([illegible])	11.82 ([illegible])	Barometer
27.98 (20.86)	2345	3.56 ([illegible])	0.879 ([illegible])	7.86 ([illegible])	28.73" Hg (97.29 kPa)
0.26 (0.19)	2367	2.47 ([illegible])	66.652 ([illegible])	0.10 ([illegible])	

Maximum Torque 384 lb.-ft. (521 N.m) at 1500 rpm
Maximum Torque Rise 30.3%
Torque Rise at 1660 engine rpm 21%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th Gear									
104.28 (77.76)	8873 (39.47)	4.41 (7.09)	2198	5.72	0.482 (0.293)	14.35 (2.83)	188 (87)	72 (22)	28.94 ([illegible])
75% of Pull at Maximum Power—7th Gear									
81.87 (61.05)	6654 (29.60)	4.61 (7.42)	2273	2.68	0.528 (0.321)	13.09 (2.58)	183 (84)	72 (22)	28.90 ([illegible])
50% of Pull at Maximum Power—7th Gear									
56.05 (41.79)	4440 (19.75)	4.73 (7.61)	2309	1.69	0.621 (0.378)	11.13 (2.19)	181 (83)	72 (22)	28.90 ([illegible])
75% of Pull at Reduced Engine Speed—9th Gear									
81.61 (60.86)	6654 (29.60)	4.60 (7.40)	1757	2.00	0.478 (0.291)	14.45 (2.85)	185 (85)	72 (22)	28.90 ([illegible])
50% of Pull at Reduced Engine Speed—9th Gear									
55.96 (41.73)	4438 (19.74)	4.73 (7.61)	1789	1.69	0.539 (0.328)	12.83 (2.53)	180 (82)	72 (22)	28.90 ([illegible])

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: April-May, 1989.

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704.

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8401 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 3.820 gal *(14.458 l)* **Drained from motor** 3.693 gal *(13.980 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 25.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T101998* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 49.6-54.1 lb/hr *(22.5-24.5 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 12-15 psi *(83-103 kPa)* as measured 12.2 psi *(84 kPa)*.

CHASSIS: Type front wheel assist **Serial No.** *RW4255P001019* **Tread width** rear 62.0" *(1574 mm)* to 110.2" *(2800 mm)* front 60.6" *(1538 mm)* to 88.0" *(2235 mm)* **Wheel base** 105.3" *(2675 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.41 *(2.27)* second 2.02 *(3.25)* third 2.38 *(3.83)* fourth 3.06 *(4.93)* fifth 3.53 *(5.68)* sixth 4.01 *(6.45)* seventh 4.61 *(7.43)* eighth 5.17 *(8.32)* ninth 5.96 *(9.58)* tenth 6.76 *(10.88)* eleventh 7.79 *(12.53)* twelfth 8.94 *(14.38)* thirteenth 11.06 *(17.80)* fourteenth 15.08 *(24.27)* fifteenth 18.65 *(30.02)* reverse 1.72 *(2.76)*, 2.46 *(3.96)*, 3.73 *(6.01)*, 5.62 *(9.05)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 14050 lb *(6373 kg)*.

DRAWBAR PERFORMANCE AT 2000 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
93.89 (70.01)	13548 (60.26)	2.60 (4.18)	2196	13.28	0.540 (0.328)	12.80 (2.52)	185 (85)	65 (18)	29.06 (98.41)
5th Gear									
104.00 (77.55)	12577 (55.95)	3.10 (4.99)	2100	7.37	0.487 (0.296)	14.21 (2.80)	187 ([illegible])	64 (18)	29.07 (98.44)
6th Gear									
106.24 (79.22)	11789 (52.44)	3.38 (5.44)	2004	6.38	0.471 ([illegible])	14.50 (2.86)	187 (86)	67 (19)	29.04 (98.34)
7th Gear									
109.43 (81.60)	10289 (45.77)	3.99 (6.42)	2001	4.20	0.457 (0.278)	15.12 (2.98)	186 (85)	63 (17)	29.06 (98.41)
8th Gear									
106.45 (79.38)	8877 (39.48)	4.50 (7.24)	1997	3.40	0.464 (0.282)	14.73 (2.90)	185 (85)	65 ([illegible])	29.08 (98.48)
9th Gear									
106.41 (79.35)	7644 (34.00)	5.22 (8.40)	2003	2.92	0.470 (0.286)	14.72 (2.90)	188 (86)	67 (19)	29.03 (98.31)
10th Gear									
106.59 (79.48)	6731 (29.94)	5.94 (9.56)	1999	2.71	0.469 (0.285)	14.73 (2.90)	186 (86)	69 (21)	29.02 (98.27)
11th Gear									
106.01 (79.05)	5782 (25.72)	6.88 (11.06)	2000	2.10	0.472 (0.287)	14.65 (2.89)	187 (86)	69 (21)	29.01 (98.24)
12th Gear									
108.93 (81.23)	5164 (22.97)	7.91 (12.73)	2000	1.77	0.456 (0.277)	15.16 (2.99)	188 (86)	70 (21)	29.00 (98.21)
13th Gear									
105.86 (78.94)	4038 (17.96)	9.83 (15.82)	2000	1.36	0.471 (0.287)	14.67 (2.89)	188 (86)	71 (22)	28.99 (98.17)

DRAWBAR PERFORMANCE AT 2000 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
85.79 (63.97)	15746 (70.04)	2.04 (3.29)	2249	14.53	0.573 (0.349)	12.05 (2.37)	186 (86)	72 (22)	28.67 (97.09)
4th Gear									
101.77 (75.89)	14006 (62.30)	2.72 (4.39)	2122	7.16	0.493 (0.300)	14.01 (2.76)	188 (87)	79 (26)	28.68 (97.12)
5th Gear									
104.45 (77.89)	13074 (58.16)	3.00 (4.82)	2000	6.03	0.477 (0.290)	14.49 (2.85)	189 (87)	81 (27)	28.68 (97.12)
6th Gear									
105.74 (78.85)	11492 (51.12)	3.45 (5.55)	2001	4.72	0.470 (0.286)	14.70 (2.89)	190 (88)	83 (28)	28.69 (97.16)
7th Gear									
107.82 (80.40)	10019 (44.57)	4.04 (6.49)	2002	3.30	0.460 (0.280)	15.01 (2.96)	187 (86)	71 (22)	28.66 (97.05)
8th Gear									
105.40 (78.60)	8727 (38.82)	4.53 (7.29)	2002	2.97	0.474 (0.288)	14.58 (2.87)	190 (88)	81 (27)	28.64 (96.99)
9th Gear									
105.08 (78.36)	7509 (33.40)	5.25 (8.45)	2003	2.48	0.475 (0.289)	14.56 (2.87)	191 (88)	81 (27)	28.64 (96.99)
10th Gear									
104.98 (78.29)	6592 (29.32)	5.97 (9.61)	2001	2.32	0.478 (0.291)	14.47 (2.85)	189 (87)	76 (24)	28.64 (96.99)
11th Gear									
104.73 (78.10)	5690 (25.31)	6.90 (11.11)	2002	1.99	0.477 (0.290)	14.50 (2.86)	191 (88)	82 (28)	28.64 (96.99)
12th Gear									
107.41 (80.09)	5074 (22.57)	7.94 (12.78)	2002	1.74	0.464 (0.282)	14.88 (2.93)	190 (88)	81 (27)	28.64 (96.99)
13th Gear									
104.00 (77.55)	3955 (17.59)	9.86 (15.87)	2002	1.33	0.481 (0.292)	14.38 (2.83)	191 (88)	83 (28)	28.64 (96.99)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 121° F *(49° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb *(2971 kg)* or 8470 lb *(3842 kg)* with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the O[illegible] [illegible]cted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1618**, Summary 056, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing	Air dry bulb	Barom. inch Hg (kPa)
				3rd Gear					
86.79 [illegible]	13[illegible] [illegible]	2.06 [illegible]	224[illegible]	[illegible]	0.5[illegible] [illegible]	[illegible]	1[illegible]	[illegible]	28.66 [illegible]
				4th Gear					
101.24 [illegible]	[illegible] [illegible]	2.90 [illegible]	2200	[illegible]	0.4[illegible] [illegible]	[illegible]	1[illegible]	[illegible]	28.6[illegible] [illegible]
				5th Gear					
[illegible] [illegible]	11517 [illegible]	3.3[illegible] [illegible]	2199	[illegible]	0.49[illegible] [illegible]	[illegible]	[illegible]	8[illegible]	28.6[illegible]
				6th Gear					
[illegible] [illegible]	10101 [illegible]	3.8[illegible] [illegible]	2201	3.44	0.480 [illegible]	[illegible]	[illegible]	8[illegible]	28.6[illegible] [illegible]
				7th Gear					
101.96 [illegible]	8[illegible] [illegible]	4.40 [illegible]	2198	[illegible]	0.48[illegible] [illegible]	14.2[illegible] [illegible]	1[illegible] [illegible]	[illegible]	28.6[illegible] [illegible]
				8th Gear					
[illegible] [illegible]	7329 [illegible]	[illegible] [illegible]	2201	[illegible]	[illegible] [illegible]	[illegible]	[illegible] [illegible]	8[illegible]	28.64 [illegible]
				9th Gear					
[illegible] [illegible]	6492 [illegible]	5.78 [illegible]	2200	[illegible]	[illegible] [illegible]	[illegible]	1[illegible] [illegible]	8[illegible]	28.64 [illegible]
				10th Gear					
100.08 [illegible]	5707 25.39	6.58 (10.58)	2197	2.08	0.50[illegible] [illegible]	[illegible]	1[illegible] [illegible]	78 [illegible]	28.64 [illegible]
				11th Gear					
100.55 [illegible]	4947 22.01	7.61 (12.24)	2199	1.66	0.500 [illegible]	13.82 [illegible]	190 88	82 28	28.64 [illegible]
				12th Gear					
[illegible] [illegible]	4361 [illegible]	8.76 [illegible]	2202	[illegible]	[illegible] [illegible]	[illegible]	[illegible]	8[illegible]	28.64 [illegible]

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	75.0
Maximum sound level	[illegible]
Transport speed—no load—15th Gear	[illegible]
Bystander in 15th Gear	86.[illegible]

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2197	1983	1763	1542	1325	1101
Pull—lbs (kN)	5707 (25.39)	6645 (29.56)	7265 (32.32)	7519 (33.45)	7761 (34.52)	7523 (33.46)
Increase in Pull %	0	16	27	32	36	32
Power—Hp (kW)	100.08 (74.63)	104.89 (78.21)	101.57 (75.74)	91.86 (68.50)	81.36 (60.67)	65.63 (48.94)
Speed—Mph (km/h)	6.58 (10.58)	5.92 (9.53)	5.24 (8.44)	4.58 (7.37)	3.93 (6.33)	3.27 (5.27)
Slip %	2.08	2.32	2.48	2.65	2.81	2.65

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2520 (174)
Location	remote outlet
Hydraulic oil temperature °F (°C)	142 (61)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in. (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6326 (28.1)	6175 (27.5)
			with lift assist cylinder		
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8633 (38.4)	8077 (35.9)

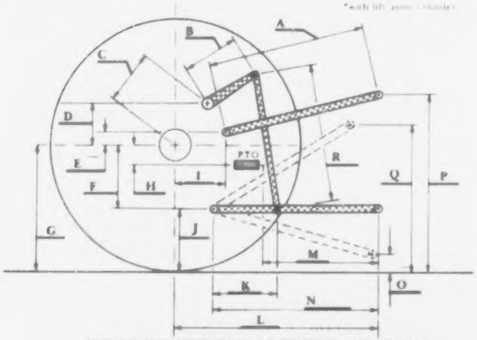
TIRES AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4R38; [illegible]	Two 18.4R38; [illegible]
Ballast	—Fluid (total)	[illegible]	None
	—Cast Iron (total)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 14.9R26; [illegible]	Two 14.9R26; [illegible]
Ballast	—Test Equip (total)	[illegible]	None
	—Cast Iron (total)	None	None
Height of Drawbar		[illegible]	17 in ([illegible] mm)
Static Weight	—Rear	[illegible]	[illegible]
	—Front	[illegible]	[illegible]
	—Total	[illegible]	[illegible]

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: II
Quick Attach: None

Maximum Force Exerted Through Whole Range	[illegible] lbs ([illegible] kN) *[illegible] lbs ([illegible] kN)
i) Opening pressure of relief valve	NA
ii) Sustained pressure with pump stalled	2520 psi ([illegible] Bar)
iii) Pump delivery rate at minimum pressure	[illegible] GPM ([illegible] l/min)
iv) Pump delivery rate at maximum hydraulic power	26.2 GPM ([illegible] l/min)
Delivery pressure	[illegible] psi ([illegible] Bar)
Power	[illegible] Hp ([illegible] kW)

*with lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	26.6	676
B	11.5	292
C	11.3	287
D	10.9	275
E	5.6	143
F	10.1	256
G	33.1	842
H	6.5	165
I	14.3	362
J	22.9	583
K	23.1	587
L	41.6	1056
M	22.0	558
N	37.1	942
O	8.3	211
P	43.0	1093
Q	35.5	903
R	32.8	833

John Deere 4255 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1619—SUMMARY 057
JOHN DEERE 4455 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank-shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
141.60 (105.59)	2200	8.38 (31.74)	0.409 (0.249)	16.89 (3.33)	
Maximum Power (2 Hours)					
146.90 (109.54)	1850	8.05 (30.48)	0.379 (0.231)	18.24 (3.59)	
VARYING POWER AND FUEL CONSUMPTION					Air temperature
141.60 (105.59)	2200	8.38 (31.74)	0.409 (0.249)	16.89 (3.33)	77°F (25°C)
122.85 (91.61)	2243	7.55 (28.59)	0.425 (0.258)	16.27 (3.20)	Relative humidity
93.33 (69.59)	2276	6.29 (23.82)	0.466 (0.283)	14.83 (2.92)	28%
63.12 (47.07)	2310	5.03 (19.06)	0.551 (0.335)	12.54 (2.47)	Barometer
31.94 (23.82)	2338	3.78 (14.29)	0.817 (0.497)	8.46 (1.67)	29.12" Hg (98.61 kPa)
0.51 (0.38)	2363	2.56 (9.69)	34.526 (21.002)	0.20 (0.04)	

Maximum Torque 444 lb.-ft. (602 Nm) at 1700 rpm

Maximum Torque Rise 31.4%

Torque Rise at 1800 engine rpm 25%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th Gear									
122.53 (91.37)	5126 (22.80)	8.96 (14.43)	2199	2.41	0.475 (0.288)	14.62 (2.88)	188 (87)	74 (23)	28.84 (97.66)
75% of Pull at Maximum Power—12th Gear									
94.70 (70.62)	3843 (17.09)	9.24 (14.87)	2254	1.80	0.518 (0.315)	13.33 (2.63)	186 (85)	76 (24)	28.84 (97.66)
50% of Pull at Maximum Power—12th Gear									
64.58 (48.16)	2562 (11.40)	9.45 (15.21)	2291	1.17	0.611 (0.372)	11.32 (2.23)	184 (84)	77 (25)	28.84 (97.66)
75% of Pull at Reduced Engine Speed—13th Gear									
94.72 (70.64)	3843 (17.10)	9.24 (14.87)	1821	1.71	0.476 (0.290)	14.53 (2.86)	186 (86)	76 (24)	28.84 (97.66)
50% of Pull at Reduced Engine Speed—13th Gear									
64.53 (48.12)	2563 (11.40)	9.44 (15.20)	1850	1.17	0.542 (0.330)	12.75 (2.51)	182 (83)	80 (27)	28.84 (97.66)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: April-May, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.166 gal *(15.768 l)* **Drained from motor** 4.122 gal *(15.605 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 30.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T102604* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 56.3-61.5 lb/hr *(25.6-27.9 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 14-17 psi *(97-117 kPa)* as measured 14.5 psi *(100 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW4455P001020* **Tread width** rear 62.0" *(1574 mm)* to 116.0" *(2950 mm)* front 60.6" *(1538 mm)* to 88.0" *(2235 mm)* **Wheel base** 105.3" *(2675 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.45 *(2.34)* second 2.08 *(3.35)* third 2.51 *(4.05)* fourth 3.16 *(5.08)* fifth 3.64 *(5.86)* sixth 4.13 *(6.65)* seventh 4.76 *(7.66)* eighth 5.47 *(8.80)* ninth 6.30 *(10.13)* tenth 7.15 *(11.50)* eleventh 8.23 *(13.25)* twelfth 9.21 *(14.82)* thirteenth 11.40 *(18.35)* fourteenth 15.94 *(25.66)* fifteenth 19.73 *(31.75)* reverse 2.01 *(3.24)*, 2.88 *(4.64)*, 4.37 *(7.04)*, 6.59 *(10.60)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 15275 lb *(6929 kg)*

DRAWBAR PERFORMANCE AT 1850 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
113.25 (84.45)	14200 (63.16)	2.99 (4.81)	2126	14.74	0.506 (0.308)	13.66 (2.69)	183 (84)	48 (9)	29.12 (98.61)
6th Gear									
121.57 (90.66)	12794 (56.91)	3.56 (5.73)	2083	8.53	0.467 (0.284)	14.79 (2.91)	183 (84)	48 (9)	29.12 (98.61)
7th Gear									
125.11 (93.29)	11864 (52.77)	3.95 (6.36)	1975	7.14	0.449 (0.273)	15.40 (3.03)	183 (84)	48 (9)	29.12 (98.61)
8th Gear									
121.45 (90.56)	10555 (46.94)	4.32 (6.95)	1848	5.66	0.458 (0.278)	15.10 (2.97)	183 (84)	48 (9)	29.12 (98.61)
9th Gear									
122.81 (91.58)	9134 (40.63)	5.04 (8.11)	1852	4.92	0.451 (0.274)	15.33 (3.02)	183 (84)	48 (9)	29.12 (98.61)
10th Gear									
123.62 (92.18)	8037 (35.75)	5.77 (9.28)	1852	3.87	0.446 (0.271)	15.50 (3.05)	184 (84)	48 (9)	29.12 (98.61)
11th Gear									
122.93 (91.67)	6897 (30.68)	6.68 (10.76)	1832	3.27	0.451 (0.274)	15.34 (3.02)	184 (84)	48 (9)	29.12 (98.61)
12th Gear									
126.69 (94.47)	6338 (28.19)	7.50 (12.06)	1851	2.93	0.437 (0.266)	15.80 (3.11)	184 (84)	48 (9)	29.12 (98.61)
13th Gear									
124.35 (92.73)	4988 (22.21)	9.35 (15.05)	1849	2.32	0.448 (0.272)	15.44 (3.04)	184 (84)	48 (9)	29.12 (98.61)

DRAWBAR PERFORMANCE AT 1850 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
100.17 (74.69)	17366 (77.25)	2.16 (3.48)	2233	14.73	0.548 (0.334)	12.60 (2.48)	186 (86)	72 (22)	28.57 (96.75)
4th Gear									
118.19 (88.14)	15455 (68.75)	2.87 (4.62)	2176	7.70	0.488 (0.297)	14.16 (2.79)	186 (85)	71 (22)	28.57 (96.75)
5th Gear									
122.40 (91.28)	15064 (67.01)	3.05 (4.90)	2001	7.15	0.464 (0.282)	14.90 (2.93)	189 (87)	72 (22)	28.72 (97.26)
6th Gear									
123.94 (92.42)	14374 (63.94)	[illegible]	1851	6.28	0.453 (0.276)	15.25 (3.00)	187 (86)	68 (20)	28.72 (97.26)
7th Gear									
126.10 (94.03)	12474 (55.49)	3.79 (6.10)	1854	4.90	0.443 (0.269)	15.61 (3.07)	187 (86)	65 (18)	28.72 (97.26)
8th Gear									
121.04 (90.26)	10335 (45.97)	4.39 (7.07)	1851	5.98	0.462 (0.281)	14.97 (2.95)	190 (88)	74 (23)	28.72 (97.26)
9th Gear									
121.52 (90.62)	8959 (39.85)	5.09 (8.19)	1851	3.30	0.462 (0.281)	14.98 (2.95)	190 (88)	76 (24)	28.72 (97.26)
10th Gear									
122.44 (91.31)	7918 (35.22)	5.80 (9.33)	1852	2.96	0.455 (0.277)	15.19 (2.99)	190 (88)	76 (24)	28.72 (97.26)
11th Gear									
120.82 (90.10)	6753 (30.04)	6.71 (10.80)	1850	2.62	0.460 (0.280)	15.02 (2.96)	190 (88)	79 (26)	28.73 (97.29)
12th Gear									
124.94 (93.17)	6219 (27.66)	7.53 (12.13)	1854	2.36	0.449 (0.273)	15.40 (3.03)	189 (87)	80 (27)	28.73 (97.29)
13th Gear									
120.97 (90.21)	4846 (21.55)	9.36 (15.07)	1852	1.83	0.458 (0.278)	15.10 (2.98)	189 (87)	85 (29)	28.73 (97.29)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 129° F (54° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb *(2971 kg)* or 8470 lb *(3842 kg)* with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1619**, Summary 057, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
100.65 ([illegible])	17346 ([illegible])	2.17 ([illegible])	2213	[illegible]	0.548 ([illegible])	12.62 ([illegible])	186 ([illegible])	73 ([illegible])	28.57 ([illegible])
4th Gear									
118.09 (88.06)	15218 ([illegible])	2.91 (4.68)	2198	[illegible]	0.488 ([illegible])	14.17 ([illegible])	186 (85)	73 (23)	28.57 ([illegible])
5th Gear									
121.02 (90.24)	13287 ([illegible])	3.42 ([illegible])	2200	5.47	0.478 ([illegible])	14.43 ([illegible])	187 (86)	70 (21)	28.72 (97.26)
6th Gear									
122.78 (91.56)	11750 ([illegible])	3.92 ([illegible])	2200	[illegible]	0.473 ([illegible])	14.66 ([illegible])	187 (86)	66 (19)	28.72 (97.26)
7th Gear									
123.72 ([illegible])	[illegible] ([illegible])	[illegible]	2200	3.83	0.468 ([illegible])	14.77 ([illegible])	186 (85)	65 (18)	28.72 (97.26)
8th Gear									
[illegible] (88.41)	8414 ([illegible])	[illegible]	2198	[illegible]	0.490 (0.298)	14.12 ([illegible])	189 (87)	76 (24)	28.72 (97.26)
9th Gear									
118.44 (88.32)	7290 ([illegible])	6.09 (9.80)	2198	2.70	0.488 (0.297)	14.15 ([illegible])	190 (88)	76 (24)	28.72 (97.26)
10th Gear									
118.12 (88.09)	6394 (28.44)	6.93 (11.15)	2200	2.44	0.486 (0.296)	14.22 (2.80)	189 (87)	76 (24)	28.72 (97.26)
11th Gear									
116.75 (87.06)	[illegible] ([illegible])	8.01 (12.89)	2198	2.09	0.489 (0.297)	14.15 ([illegible])	190 (88)	79 (26)	28.73 (97.29)
12th Gear									
[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	2198	1.85	0.479 ([illegible])	14.44 ([illegible])	190 (88)	82 (28)	28.73 (97.29)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	74.5
Maximum sound level	76.5
Transport speed—no load—15th Gear	77.0
Bystander in 15th Gear	87.0

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2200	1978	1755	1542	1321	1101
Pull—lbs (kN)	6394 (28.44)	7221 (32.12)	8302 (36.93)	8501 (37.81)	8502 (37.82)	8180 (36.39)
Increase in Pull %	0	13	30	33	33	28
Power—Hp (kW)	118.12 (88.09)	119.60 (89.19)	121.54 (90.63)	109.25 (81.47)	93.60 (69.80)	75.07 (55.98)
Speed—Mph (km/h)	6.93 (11.15)	6.21 (10.00)	5.49 (8.84)	4.82 (7.76)	4.13 (6.64)	3.44 (5.54)
Slip %	2.44	2.62	3.13	3.13	3.13	3.13

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2530 (174)
Location	remote outlet
Hydraulic oil temperature °F(°C)	144 (62)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6526 (29.0)	6175 (27.5)
with lift assist cylinder					
Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8633 (38.4)	8077 (35.9)

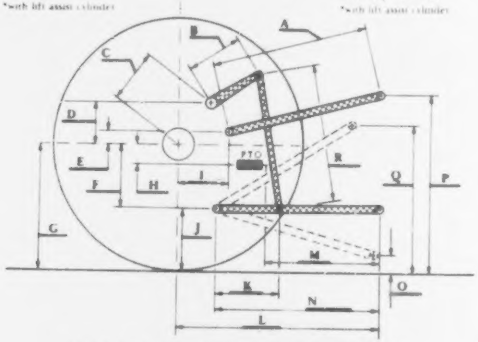
TIRES AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4R42; **; 12 (83)	Two 18.4R42; **; 16 (110)
Ballast	—Duals (total)	1720 lb (780 kg)	None
	—Cast iron (total)	1000 lb (454 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 14.9R30; ***; 36 (248)	Two 14.9R30; ***; 36 (248)
Ballast	—Test Equip (total)	115 lb (52 kg)	None
	—Cast iron (total)	100 lb (45 kg)	None
Height of Drawbar		18.5 in (470 mm)	18.5 in (470 mm)
Static Weight	—Rear	12630 lb (5729 kg)	9825 lb (4456 kg)
	—Front	5570 lb (2526 kg)	5450 lb (2472 kg)
	—Total	18200 lb (8255 kg)	15275 lb (6928 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum Force Exerted Through Whole Range	5504 lbs (24.5 kN) *7281 lbs (32.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2530 psi (174 Bar)
ii) Pump delivers rate at minimum pressure	27.0 GPM (102.2 l/min)
iii) Pump delivers rate at maximum hydraulic power	25.7 GPM (97.3 l/min)
Delivers pressure	2100 psi (145 Bar)
Power	31.5 Hp (23.5 kW)
*with lift assist cylinder	*with lift assist cylinder



	inch	mm
A	26.6	*676*
B	11.5	*292*
C	11.3	*287*
D	10.9	*278*
E	5.6	*143*
F	10.2	*259*
G	35.1	*892*
H	6.5	*165*
I	14.3	*362*
J	24.9	*633*
K	23.1	*587*
L	41.6	*1056*
M	22.0	*558*
N	37.1	*942*
O	10.3	*262*
P	45.0	*1143*
Q	37.5	*953*
R	32.8	*833*

HITCH DIMENSIONS AS TESTED—NO LOAD

John Deere 4455 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1620—SUMMARY 058
JOHN DEERE 4555 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—998 rpm)					
156.89 (116.99)	2200	8.94 (33.83)	0.394 (0.240)	17.55 (3.46)	
Maximum Power (2 Hours)					
162.47 (121.15)	2088	8.72 (32.99)	0.371 (0.226)	18.64 (3.67)	
VARYING POWER AND FUEL CONSUMPTION					Air temperature
156.89 (116.99)	2200	8.94 (33.83)	0.394 (0.240)	17.55 (3.46)	77°F (25°C)
135.69 (101.18)	2242	7.99 (30.21)	0.407 (0.248)	16.98 (3.35)	Relative humidity
103.69 (77.32)	2276	6.60 (24.97)	0.440 (0.268)	15.72 (3.10)	55%
70.56 (52.61)	2325	5.25 (19.88)	0.514 (0.313)	13.43 (2.65)	Barometer
35.55 (26.51)	2358	3.82 (14.46)	0.743 (0.452)	9.31 (1.83)	29.10" Hg (98.54 kPa)
0.77 (0.58)	2389	2.43 (9.20)	21.706 (13.203)	0.32 (0.06)	

Maximum Torque 496 lb.-ft. (672 Nm) at 1600 rpm
Maximum Torque Rise 32.6%
Torque Rise at 1900 engine rpm 25%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th Gear									
131.40 (97.99)	5811 (25.85)	8.48 (13.65)	2199	2.26	0.470 (0.286)	14.70 (2.90)	184 (84)	72 (22)	28.82 (97.60)
75% of Pull at Maximum Power—12th Gear									
101.78 (75.90)	4357 (19.38)	8.76 (14.10)	2257	1.64	0.504 (0.307)	13.70 (2.70)	184 (84)	76 (24)	28.81 (97.56)
50% of Pull at Maximum Power—12th Gear									
69.64 (51.93)	2906 (12.93)	8.99 (14.46)	2301	1.02	0.600 (0.365)	11.53 (2.27)	180 (82)	76 (24)	28.81 (97.56)
75% of Pull at Reduced Engine Speed—13th Gear									
101.57 (75.74)	4354 (19.37)	8.75 (14.08)	1822	1.64	0.468 (0.285)	14.76 (2.91)	183 (84)	76 (24)	28.81 (97.56)
50% of Pull at Reduced Engine Speed—13th Gear									
69.85 (52.08)	2916 (12.97)	8.98 (14.46)	1858	1.02	0.530 (0.322)	13.05 (2.57)	181 (83)	76 (24)	28.81 (97.56)

Location of Test: Center for Agricultural Equipment, Lincoln Nebraska 68583-0832, U.S.A.

Dates of Test: April-May, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 5.433 gal *(20.564 l)* **Drained from motor** 5.233 gal *(19.809 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 29.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T102916* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 59.9-65.4 lb/hr *(27.2-29.7 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 15-18 psi *(103-124 kPa)* as measured 16.5 psi *(114 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW4555P001019* **Tread width** rear 62.0" *(1574 mm)* to 115.7" *(2938 mm)* front 63.1" *(1603 mm)* to 85.3" *(2166 mm)* **Wheel base** 117.1" *(2974 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.38 *(2.22)* second 1.97 *(3.18)* third 2.38 *(3.84)* fourth 3.00 *(4.82)* fifth 3.45 *(5.55)* sixth 3.92 *(6.30)* seventh 4.51 *(7.26)* eighth 5.18 *(8.34)* ninth 5.97 *(9.61)* tenth 6.78 *(10.91)* eleventh 7.81 *(12.57)* twelfth 8.74 *(14.06)* thirteenth 10.81 *(17.40)* fourteenth 15.12 *(24.34)* fifteenth 18.71 *(30.11)* reverse 1.91 *(3.07)*, 2.73 *(4.40)*, 4.15 *(6.67)*, 6.25 *(10.06)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 998 rpm at 2200 engine rpm **Unladen tractor mass** 17755 lb *(8053 kg)*

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
120.34 (89.74)	15505 (68.97)	2.89 (4.66)	2160	13.92	0.513 (0.312)	13.48 (2.65)	183 (84)	58 (14)	28.63 (96.95)
6th Gear									
128.04 (95.52)	14051 (62.50)	3.42 (5.50)	2140	9.59	0.482 (0.293)	14.34 (2.83)	183 (84)	60 (16)	28.63 (96.95)
7th Gear									
132.62 (98.89)	12792 (56.90)	3.89 (6.26)	2049	6.82	0.464 (0.282)	14.88 (2.93)	183 (84)	58 (14)	28.83 (97.63)
8th Gear									
130.94 (97.64)	11786 (52.43)	4.17 (6.70)	1980	6.11	0.462 (0.281)	14.96 (2.95)	184 (84)	64 (18)	28.64 (96.99)
9th Gear									
134.05 (99.96)	10273 (45.70)	4.89 (7.87)	1911	4.72	0.451 (0.274)	15.32 (3.02)	185 (85)	59 (15)	28.83 (97.63)
10th Gear									
134.04 (99.96)	9008 (40.07)	5.58 (8.98)	1902	4.05	0.451 (0.274)	15.34 (3.02)	186 (85)	66 (19)	28.64 (96.99)
11th Gear									
133.06 (99.22)	7687 (34.19)	6.49 (10.45)	1902	3.12	0.453 (0.276)	15.25 (3.00)	186 (86)	67 (19)	28.82 (97.60)
12th Gear									
138.45 (103.24)	7124 (31.69)	7.29 (11.73)	1902	2.86	0.434 (0.264)	15.94 (3.14)	186 (85)	70 (21)	28.82 (97.60)
13th Gear									
135.47 (101.02)	5592 (24.87)	9.08 (14.62)	1903	2.26	0.446 (0.271)	15.49 (3.05)	186 (86)	71 (22)	28.82 (97.60)

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
113.78 (84.84)	20875 (92.85)	2.04 (3.29)	2233	14.85	0.525 (0.319)	13.18 (2.60)	184 (84)	50 (10)	29.01 (98.24)
4th Gear									
131.44 (98.02)	18729 (83.31)	2.63 (4.24)	2126	8.58	0.472 (0.287)	14.66 (2.89)	184 (84)	50 (10)	29.07 (98.44)
5th Gear									
132.37 (98.71)	17978 (79.97)	2.76 (4.44)	1926	7.85	0.461 (0.281)	14.98 (2.95)	184 (84)	53 (12)	29.06 (98.41)
6th Gear									
137.51 (102.54)	16401 (72.95)	3.14 (5.06)	1899	6.19	0.443 (0.270)	15.60 (3.07)	185 (85)	54 (12)	29.06 (98.41)
7th Gear									
140.10 (104.48)	14269 (63.47)	3.68 (5.93)	1901	4.81	0.436 (0.265)	15.86 (3.13)	185 (85)	53 (12)	29.07 (98.44)
8th Gear									
134.95 (100.63)	11840 (52.66)	4.27 (6.88)	1903	3.81	0.453 (0.276)	15.25 (3.00)	185 (85)	56 (13)	29.00 (98.21)
9th Gear									
134.13 (100.02)	10152 (45.16)	4.95 (7.97)	1903	3.22	0.454 (0.276)	15.21 (3.00)	186 (85)	56 (13)	28.99 (98.17)
10th Gear									
135.54 (101.07)	9019 (40.12)	5.64 (9.07)	1901	2.88	0.448 (0.272)	15.43 (3.04)	185 (85)	54 (12)	29.06 (98.41)
11th Gear									
134.55 (100.34)	7737 (34.42)	6.52 (10.50)	1902	2.44	0.448 (0.272)	15.43 (3.04)	185 (85)	57 (14)	28.99 (98.17)
12th Gear									
139.28 (103.86)	7143 (31.77)	7.31 (11.77)	1902	2.36	0.435 (0.265)	15.88 (3.13)	185 (85)	58 (14)	28.98 (98.14)
13th Gear									
135.19 (100.81)	5587 (24.85)	9.07 (14.60)	1899	2.01	0.447 (0.272)	15.48 (3.05)	185 (85)	58 (14)	28.98 (98.14)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125° F *(52° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 8870 lb *(4023 kg)* or 9710 lb *(4404 kg)* with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1620**, Summary 058, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
				3rd Gear					
114.57 (85.43)	20028 (89.09)	2.05 (3.30)	2233	14.38	[illegible]	13.25 (2.61)	183 (84)	50 (10)	28.96 (98.07)
				4th Gear					
130.79 (97.46)	17794 (79.15)	2.76 (4.44)	2200	6.96	0.473 (0.288)	14.06 (2.77)	183 (84)	50 (10)	29.05 (98.37)
				5th Gear					
132.13 (98.53)	15325 (68.17)	3.24 (5.21)	2201	5.30	0.467 (0.284)	14.93 (2.94)	184 (84)	53 (12)	29.07 (98.44)
				6th Gear					
134.12 (100.02)	13576 (60.39)	3.7? [illegible]	2201	4.79	0.458 (0.279)	[illegible]	184 (84)	53 (12)	29.06 (98.41)
				7th Gear					
135.08 (100.73)	11755 (52.29)	4.31 (6.94)	2201	3.64	0.460 (0.280)	[illegible]	183 (84)	52 (11)	29.07 (98.44)
				8th Gear					
129.27 (96.39)	9743 (43.35)	4.97 (8.00)	2198	3.22	0.482 (0.293)	13.33 (2.63)	184 (84)	56 (13)	29.00 (98.21)
				9th Gear					
128.43 (95.77)	8362 (37.20)	5.76 (9.27)	2199	2.70	0.481 (0.292)	14.38 (2.83)	183 (84)	56 (13)	29.00 (98.21)
				10th Gear					
129.73 (96.74)	7430 (33.05)	6.55 (10.54)	2198	2.44	0.474 (0.288)	[illegible]	184 (84)	55 (13)	29.04 (98.34)
				11th Gear					
128.27 (95.65)	6352 (28.25)	7.57 (12.19)	2196	2.10	0.485 (0.295)	14.10 (2.78)	183 (84)	57 (14)	28.99 (98.17)
				12th Gear					
131.46 (98.03)	5805 (25.82)	8.49 (13.67)	2201	2.01	0.467 (0.284)	14.79 (2.91)	184 (84)	57 (14)	28.98 (98.14)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	76.5
Maximum sound level	77.0
Transport speed—no load—15th Gear	77.5
Bystander in 15th Gear	88.0

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2198	1981	1763	1539	1321	1094
Pull—lbs (kN)	7430 (33.05)	8602 (38.26)	9696 (43.13)	10143 (45.12)	10012 (44.54)	9573 (42.58)
Increase in Pull %	0	16	30	37	35	29
Power—Hp (kW)	129.73 (96.74)	134.94 (100.62)	134.91 (100.60)	122.96 (91.69)	104.09 (77.62)	82.61 (61.60)
Speed—Mph (km/h)	6.55 (10.54)	5.88 (9.47)	5.22 (8.40)	4.55 (7.32)	3.90 (6.27)	3.24 (5.21)
Slip %	2.44	2.62	2.96	3.36	3.30	2.96

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2550 (176)
Location	remote outlet
Hydraulic oil temperature °F (°C)	130 (54)
Location	hydraulic sump
Category	III
Quick attach	Yes

Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	8700 (38.7)	9228 (41.0)	9432 (42.0)	8944 (39.8)	8283 (36.8)
with 1-44 mm lift assist cylinder					
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	9860 (43.9)	10570 (47.0)	10854 (48.3)	10224 (45.5)	9411 (41.9)
with 1-55 mm lift assist cylinder					
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	10518 (46.8)	11434 (50.9)	11576 (51.5)	10737 (47.8)	10041 (44.7)

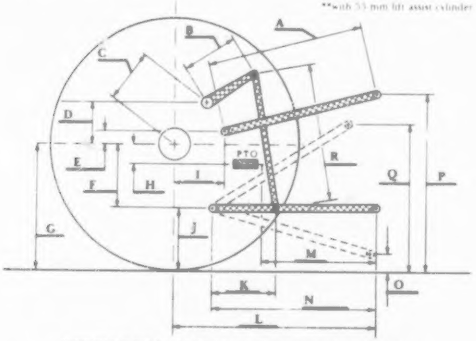
TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi (kPa)	Four 18.4R42; **; 12 (83)	Two 18.4R42; ***; 18 (124)
Ballast—Duals (total)	1710 lb (776 kg)	None
—Cast Iron (total)	1000 lb (454 kg)	None
Front Tires—No., size, ply & psi (kPa)	Two 18.4R30; ***; 30 (205)	Two 18.4R30; ***; 30 (205)
Ballast—Test Equip. (total)	190 lb (86 kg)	None
—Cast Iron (total)	1100 lb (499 kg)	None
Height of Drawbar	18.5 in (470 mm)	18.5 in (470 mm)
Static Weight—Rear	13840 lb (6278 kg)	11365 lb (5155 kg)
—Front	7915 lb (3590 kg)	6598 lb (2994 kg)
—Total	21755 lb (9868 kg)	17715 lb (8035 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: III
Quick Attach: Yes

Maximum Force Exerted Through Whole Range	5821 lbs (25.9 kN) *6614 lbs (29.4 kN) **7057 lbs (31.4 kN)
i) Opening pressure of relief valve	
Sustained pressure with pump stalled	2550 psi (176 Bar)
ii) Pump delivery rate at minimum pressure and rated engine speed	32.8 GPM (124.2 l/min)
iii) Pump delivery rate at maximum hydraulic power	31.7 GPM (120.0 l/min)
Delivery pressure	1750 psi (121 Bar)
Power	32.4 Hp (24.1 kW)

*with 44 mm lift assist cylinder
**with 55 mm lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.1	714
B	18.4	468
C	12.9	327
D	12.9	327
E	6.8	172
F	13.0	330
G	35.1	892
H	7.0	177
I	15.1	384
J	22.1	562
K	28.2	716
L	44.3	1124
L'	49.3	1251
M	22.3	565
N	38.1	968
O	9.1	231
P	44.1	1121
Q	41.5	1053
R	37.3	946

L' to end of Quick attach

John Deere 4555 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1621—SUMMARY 059
JOHN DEERE 4755 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—998 rpm)					
177.06 (132.04)	2200	9.73 (36.82)	0.380 (0.231)	18.20 (3.59)	
Maximum Power (2 Hours)					
178.96 (133.45)	2050	9.61 (36.39)	0.373 (0.227)	18.62 (3.67)	
VARYING POWER AND FUEL CONSUMPTION					Air temperature
177.06 (132.04)	2200	9.73 (36.82)	0.380 (0.231)	18.20 (3.59)	78°F (25°C)
155.14 (115.69)	2263	8.85 (33.52)	0.394 (0.240)	17.52 (3.45)	Relative humidity
117.70 (87.77)	2292	7.16 (27.11)	0.421 (0.256)	16.44 (3.24)	39%
79.51 (59.29)	2323	5.51 (20.87)	0.479 (0.291)	14.42 (2.84)	Barometer
40.16 (29.95)	2357	3.86 (14.62)	0.665 (0.404)	10.40 (2.05)	28.74" Hg (97.33 kPa)
2.08 (1.55)	2375	2.30 (8.72)	7.651 (4.654)	0.90 (0.18)	

Maximum Torque 569 lb.-ft. (771 Nm) at 1450 rpm
Maximum Torque Rise 34.5%
Torque Rise at 1900 engine rpm 12%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th Gear									
147.76 (110.19)	6267 (27.88)	8.84 (14.23)	2201	2.43	0.455 (0.277)	15.19 (2.99)	186 (86)	58 (14)	29.07 (98.44)
75% of Pull at Maximum Power—12th Gear									
115.26 (85.95)	4697 (20.89)	9.20 (14.81)	2282	1.98	0.489 (0.297)	14.14 (2.78)	184 (84)	61 (16)	29.04 (98.34)
50% of Pull at Maximum Power—12th Gear									
78.04 (58.20)	3132 (13.93)	9.34 (15.04)	2305	1.52	0.569 (0.346)	12.15 (2.39)	181 (83)	58 (14)	29.04 (98.34)
75% of Pull at Reduced Engine Speed—13th Gear									
115.49 (86.12)	4707 (20.94)	9.20 (14.81)	1842	1.98	0.459 (0.279)	15.07 (2.97)	183 (84)	59 (15)	29.04 (98.34)
50% of Pull at Reduced Engine Speed—13th Gear									
78.12 (58.25)	3131 (13.93)	9.36 (15.06)	1865	1.52	0.519 (0.316)	13.33 (2.63)	181 (83)	58 (14)	29.04 (98.34)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: April-May, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.915 gal *(18.606 l)* **Drained from motor** 4.667 gal *(17.666 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 28.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6076A102454* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 66.6-72.8 lb/hr *(30.2-33.0 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 16-19 psi *(110-131 kPa)* as measured 16.5 psi *(114 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW4755P001033* **Tread width** rear 64.6" *(1642 mm)* to 115.7" *(2938 mm)* front 66.6" *(1691 mm)* to 87.8" *(2230 mm)* **Wheel base** 117.1" *(2974 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.42 *(2.28)* second 2.03 *(3.27)* third 2.45 *(3.95)* fourth 3.08 *(4.96)* fifth 3.55 *(5.71)* sixth 4.03 *(6.49)* seventh 4.64 *(7.47)* eighth 5.33 *(8.58)* ninth 6.14 *(9.89)* tenth 6.97 *(11.22)* eleventh 8.03 *(12.93)* twelfth 8.99 *(14.46)* thirteenth 11.12 *(17.90)* fourteenth 15.56 *(25.04)* fifteenth 19.25 *(30.98)* reverse 1.96 *(3.16)*, 2.81 *(4.52)*, 4.27 *(6.87)*, 6.43 *(10.34)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 998 rpm at 2200 engine rpm **Unladen tractor mass** 18165 lb *(8239 kg)*.

DRAWBAR PERFORMANCE AT 2050 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
133.33 (99.42)	16432 (73.09)	3.04 (4.89)	2192	14.78	0.502 (0.305)	13.77 (2.71)	184 (84)	55 (13)	29.13 (98.65)
6th Gear									
145.68 (108.64)	14852 (66.06)	3.68 (5.92)	2175	8.23	0.461 (0.281)	14.99 (2.95)	181 (83)	56 (13)	29.11 (98.58)
7th Gear									
149.31 (111.34)	13767 (61.24)	4.07 (6.55)	2051	6.59	0.444 (0.270)	15.55 (3.06)	184 (84)	56 (13)	29.10 (98.54)
8th Gear									
147.50 (109.99)	11613 (51.66)	4.76 (7.67)	2050	4.82	0.448 (0.273)	15.41 (3.04)	187 (86)	57 (14)	29.09 (98.51)
9th Gear									
148.21 (110.52)	10021 (44.58)	5.55 (8.93)	2052	4.04	0.447 (0.272)	15.48 (3.05)	187 (86)	58 (14)	29.08 (98.48)
10th Gear									
150.57 (112.28)	8929 (39.72)	6.32 (10.18)	2053	3.42	0.444 (0.270)	15.58 (3.07)	186 (86)	58 (14)	29.08 (98.48)
11th Gear									
148.54 (110.76)	7597 (33.79)	7.33 (11.80)	2053	2.88	0.446 (0.271)	15.51 (3.06)	186 (86)	58 (14)	29.07 (98.44)
12th Gear									
151.39 (112.89)	6901 (30.70)	8.23 (13.24)	2053	2.61	0.436 (0.265)	15.85 (3.12)	186 (86)	60 (16)	29.06 (98.41)
13th Gear									
146.82 (109.48)	5386 (23.96)	10.22 (16.45)	2053	2.16	0.449 (0.273)	15.41 (3.04)	186 (86)	61 (16)	29.05 (98.37)

DRAWBAR PERFORMANCE AT 2050 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
131.75 (98.25)	21481 (95.55)	2.30 (3.70)	2262	9.38	0.491 (0.299)	14.07 (2.77)	185 (85)	55 (13)	29.02 (98.27)
4th Gear									
143.08 (106.70)	18882 (83.99)	2.84 (4.57)	2164	6.81	0.467 (0.284)	14.81 (2.92)	187 (86)	57 (14)	29.00 (98.21)
5th Gear									
145.44 (108.45)	16667 (74.14)	3.27 (5.27)	2125	5.13	0.461 (0.280)	15.00 (2.95)	186 (85)	60 (16)	28.99 (98.17)
6th Gear									
151.62 (113.06)	15727 (69.96)	3.62 (5.82)	2051	4.26	0.437 (0.266)	15.82 (3.12)	187 (86)	62 (17)	28.95 (98.04)
7th Gear									
149.61 (111.56)	13376 (59.50)	4.19 (6.75)	2051	3.65	0.443 (0.269)	15.62 (3.08)	187 (86)	63 (17)	28.93 (97.97)
8th Gear									
145.51 (108.50)	11246 (50.02)	4.85 (7.81)	2050	2.94	0.454 (0.276)	15.22 (3.00)	186 (86)	62 (17)	28.97 (98.10)
9th Gear									
146.62 (109.33)	9776 (43.49)	5.62 (9.05)	2053	2.49	0.454 (0.276)	15.24 (3.00)	187 (86)	61 (16)	28.98 (98.14)
10th Gear									
146.96 (109.59)	8607 (38.29)	6.40 (10.30)	2053	2.22	0.451 (0.274)	15.33 (3.02)	186 (86)	63 (17)	28.91 (97.90)
11th Gear									
145.44 (108.45)	7379 (32.82)	7.39 (11.90)	2051	1.94	0.459 (0.279)	15.06 (2.97)	187 (86)	65 (18)	28.88 (97.80)
12th Gear									
150.69 (112.37)	6817 (30.32)	8.29 (13.34)	2053	1.76	0.439 (0.267)	15.76 (3.10)	186 (86)	65 (18)	28.87 (97.77)
13th Gear									
145.63 (108.59)	5305 (23.60)	10.30 (16.57)	2054	1.39	0.455 (0.277)	15.18 (2.99)	189 (87)	65 (18)	28.87 (97.77)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125° F (52° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 8870 lb *(4023 kg)* or 9710 lb *(4404 kg)* with lift assist cylinder. The pull in 3rd gear (ballasted tractor) was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1621**, Summary 059, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
128.71 (95.98)	21192 (94.27)	2.28 (3.67)	2201	10.23	0.499 (0.304)	13.85 (2.73)	186 (85)	55 (13)	29.01 (98.24)
4th Gear									
144.03 (107.40)	18561 (82.57)	2.91 (4.68)	2202	6.23	0.467 (0.284)	14.79 (2.91)	186 (85)	55 (13)	29.00 (98.21)
5th Gear									
143.97 (107.36)	15880 (70.64)	3.40 (5.47)	2200	4.70	0.468 (0.285)	14.77 (2.91)	186 (86)	58 (14)	28.99 (98.17)
6th Gear									
149.72 (111.65)	14396 (64.04)	3.90 (6.28)	2202	3.91	0.448 (0.273)	15.41 (3.04)	186 (86)	62 (17)	28.96 (98.07)
7th Gear									
147.48 (109.98)	12263 (54.56)	4.51 (7.26)	2196	3.39	0.454 (0.276)	15.24 (3.00)	186 (85)	62 (17)	28.94 (98.00)
8th Gear									
143.79 (107.23)	10330 (45.95)	5.22 (8.40)	2199	2.58	0.466 (0.283)	14.84 (2.92)	186 (85)	62 (17)	28.97 (98.10)
9th Gear									
143.73 (107.18)	8917 (39.66)	6.05 (9.73)	2203	2.31	0.469 (0.285)	14.75 (2.91)	186 (86)	60 (16)	28.98 (98.14)
10th Gear									
143.85 (107.27)	7861 (34.97)	6.86 (11.04)	2196	1.94	0.466 (0.283)	14.83 (2.92)	186 (85)	63 (17)	28.91 (97.90)
11th Gear									
141.98 (105.87)	6700 (29.80)	7.95 (12.79)	2201	1.76	0.470 (0.286)	14.71 (2.90)	185 (85)	63 (17)	28.89 (97.83)
12th Gear									
145.55 (108.54)	6136 (27.29)	8.90 (14.32)	2199	1.58	0.461 (0.281)	14.98 (2.95)	186 (85)	65 (18)	28.89 (97.83)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th Gear	76.5
Maximum sound level	77.0
Transport speed—no load—15th Gear	77.0
Bystander in 15th Gear	85.5

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2196	1978	1762	1557	1321	1097
Pull—lbs (kN)	7861 (34.97)	8972 (39.91)	10056 (44.73)	10775 (47.93)	10785 (47.97)	9948 (44.25)
Increase in Pull %	0	14	28	37	37	27
Power—Hp (kW)	143.85 (107.27)	147.48 (109.97)	146.73 (109.42)	136.79 (102.00)	117.81 (87.85)	90.38 (67.39)
Speed—Mph (km/h)	6.86 (11.04)	6.16 (9.92)	5.47 (8.81)	4.76 (7.66)	4.10 (6.59)	3.41 (5.48)
Slip %	1.94	2.22	2.58	2.76	2.76	2.58

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2530 (174)
Location	remote outlet
Hydraulic oil temperature °F (°C)	137 (58)
Location	transmission sump
Category	III
Quick attach	Yes

Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb " " " " " " (kN)	8700 (38.7)	9228 (41.0)	9432 (42.0)	8944 (39.8)	8283 (36.8)
with 1-44 mm lift assist cylinder					
Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb " " " " " " (kN)	9860 (43.9)	10570 (47.0)	10854 (48.3)	10224 (45.5)	9411 (41.9)
with 1-55 mm lift assist cylinder					
Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb. " " " " " " (kN)	10518 (46.8)	11434 (50.9)	11576 (51.5)	10737 (47.8)	10041 (44.7)

TIRES AND WEIGHT		With Ballast	Without Ballast
Rear Tires	No., size, ply & psi (kPa)	Four 20.8R42; **; 12 (83)	Two 20.8R42; **; 16 (110)
Ballast	Duals (total)	1950 lb (885 kg)	None
	Cast Iron (total)	1000 lb (454 kg)	None
Front Tires	No., size, ply & psi (kPa)	Two 16.9R30; ***; 24 (165)	Two 16.9R30; ***; 24 (165)
Ballast	Iron Equip (total)	230 lb (104 kg)	None
	Cast Iron (total)	1500 lb (680 kg)	None
Height of Drawbar		20.5 in (520 mm)	19 in (483 mm)
Static Weight	Rear	14243 lb (6461 kg)	11590 lb (5257 kg)
	Front	8600 lb (3901 kg)	6575 lb (2982 kg)
	Total	22843 lb (10362 kg)	18165 lb (8239 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

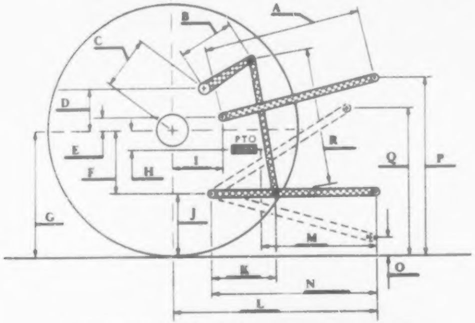
CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range	5821 lbs (25.9 kN) *6614 lbs (29.4 kN) **7057 lbs (31.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2530 psi (174 Bar)
ii) Pump delivery rate at minimum pressure	31.6 GPM (119.6 l/min)
iii) Pump delivery rate at maximum hydraulic power	30.6 GPM (115.8 l/min)
Delivery pressure	1750 psi (121 Bar)
Power	31.2 Hp (23.3 kW)

*with 44 mm lift assist cylinder

**with 55 mm lift assist cylinder



	inch	mm
A	28.1	714
B	18.4	468
C	12.9	327
D	12.9	327
E	6.8	172
F	13.0	330
G	36.1	918
H	7.0	177
I	15.1	384
J	23.1	588
K	28.2	716
L	44.3	1124
L*	49.3	1251
M	22.3	565
N	38.1	968
O	10.1	257
P	45.1	1146
Q	42.5	1080
R	37.3	946

L* to end of Quick attach

HITCH DIMENSIONS AS TESTED—NO LOAD

JOHN DEERE
4755

John Deere 4755 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1622—SUMMARY 060
JOHN DEERE 4955 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—990 rpm)					
202.73 (151.18)	2200	11.02 (41.72)	0.376 (0.229)	18.39 (3.62)	
Maximum Power (2 Hours)					
210.00 (156.60)	1951	11.45 (43.34)	0.377 (0.229)	18.34 (3.61)	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
202.73 (151.18)	2200	11.02 (41.72)	0.376 (0.229)	18.39 (3.62)	74°F (23°C)
177.27 (132.19)	2296	10.15 (38.40)	0.396 (0.241)	17.46 (3.44)	Relative humidity
134.91 (100.60)	2297	7.99 (30.25)	0.409 (0.249)	16.89 (3.33)	48%
91.46 (68.20)	2330	6.12 (23.17)	0.462 (0.281)	14.95 (2.94)	Barometer
46.05 (34.34)	2356	4.30 (16.27)	0.645 (0.392)	10.72 (2.11)	28.66" Hg (97.04 kPa)
0.77 (0.57)	2368	2.39 (9.04)	21.517 (13.088)	0.32 (0.06)	

Maximum Torque 670 lb.-ft. (909 Nm) at 1550 rpm
Maximum Torque Rise 38.5%
Torque Rise at 1800 engine rpm 11%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th Gear									
176.48 (131.60)	7486 (33.30)	8.84 (14.23)	2197	2.66	0.434 (0.264)	15.93 (3.14)	186 (86)	50 (10)	28.77 (97.43)
75% of Pull at Maximum Power—12th Gear									
137.77 (102.73)	5614 (24.97)	9.20 (14.81)	2277	2.30	0.472 (0.287)	14.65 (2.88)	184 (84)	64 (18)	28.75 (97.36)
50% of Pull at Maximum Power—12th Gear									
93.98 (70.08)	3748 (16.67)	9.40 (15.13)	2312	1.65	0.534 (0.325)	12.95 (2.55)	182 (83)	65 (18)	28.74 (97.32)
75% of Pull at Reduced Engine Speed—13th Gear									
137.85 (102.79)	5620 (25.00)	9.20 (14.80)	1839	2.20	0.451 (0.274)	15.33 (3.02)	187 (86)	64 (18)	28.75 (97.36)
50% of Pull at Reduced Engine Speed—13th Gear									
93.79 (69.94)	3742 (16.65)	9.40 (15.13)	1868	1.56	0.497 (0.302)	13.90 (2.74)	180 (82)	68 (20)	28.74 (97.32)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: April-June, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.828 gal *(18.272 l)* **Drained from motor** 4.483 gal *(16.969 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant 85W-140 **Total time engine was operated** 37.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6076A105190* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 75.3-82.2 lb/hr *(34.2-37.3 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 16-19 psi *(110-131 kPa)* as measured 16.7 psi *(115 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW4955P001024* **Tread width** rear 64.6" *(1642 mm)* to 115.7" *(2938 mm)* front 66.6" *(1691 mm)* to 87.8" *(2230 mm)* **Wheel base** 117.1" *(2974 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.42 *(2.29)* second 2.03 *(3.27)* third 2.46 *(3.96)* fourth 3.09 *(4.97)* fifth 3.56 *(5.72)* sixth 4.04 *(6.50)* seventh 4.65 *(7.49)* eighth 5.34 *(8.60)* ninth 6.16 *(9.91)* tenth 6.99 *(11.24)* eleventh 8.05 *(12.95)* twelfth 9.00 *(14.49)* thirteenth 11.14 *(17.93)* fourteenth 15.58 *(25.08)* fifteenth 19.29 *(31.04)* reverse 1.97 *(3.17)*, 2.81 *(4.53)*, 4.27 *(6.88)*, 6.44 *(10.36)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 998 rpm at 2200 engine rpm **Unladen tractor mass** 18370 lb *(8332 kg)*

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
158.13 (117.92)	17021 (75.71)	3.48 (5.61)	2201	14.57	0.480 (0.292)	14.39 (2.83)	186 (86)	52 (11)	28.78 (97.46)
7th Gear									
171.46 (127.86)	15062 (67.00)	4.26 (6.86)	2165	7.80	0.434 (0.264)	15.92 (3.14)	187 (86)	57 (14)	28.78 (97.46)
8th Gear									
172.81 (128.87)	14598 (64.93)	4.50 (7.24)	1952	6.06	0.440 (0.268)	15.71 (3.09)	186 (85)	50 (10)	28.77 (97.43)
9th Gear									
174.49 (130.12)	12463 (55.44)	5.25 (8.45)	1950	4.87	0.433 (0.264)	15.94 (3.14)	188 (87)	50 (10)	28.77 (97.43)
10th Gear									
177.01 (132.00)	11043 (49.12)	6.01 (9.67)	1952	4.08	0.430 (0.262)	16.06 (3.16)	187 (86)	50 (10)	28.77 (97.43)
11th Gear									
176.21 (131.40)	9500 (42.26)	6.96 (11.20)	1949	3.38	0.427 (0.260)	16.18 (3.19)	188 (87)	50 (10)	28.77 (97.43)
12th Gear									
182.82 (136.33)	8760 (38.96)	7.83 (12.60)	1954	3.02	0.411 (0.250)	16.80 (3.31)	188 (86)	50 (10)	28.77 (97.43)
13th Gear									
177.61 (132.44)	6858 (30.50)	9.71 (15.63)	1947	2.48	0.427 (0.260)	16.17 (3.19)	188 (87)	51 (11)	28.78 (97.46)

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
145.69 (108.64)	23715 (105.49)	2.30 (3.71)	2264	9.68	0.484 (0.295)	14.27 (2.81)	185 (85)	50 (10)	28.83 (97.63)
4th Gear									
167.70 (125.05)	22457 (99.89)	2.80 (4.51)	2146	7.69	0.458 (0.279)	15.08 (2.97)	188 (86)	50 (10)	28.84 (97.66)
5th Gear									
171.50 (127.89)	20351 (90.52)	3.16 (5.09)	2058	5.62	0.449 (0.273)	15.41 (3.04)	187 (86)	53 (12)	28.86 (97.73)
6th Gear									
174.65 (130.23)	18589 (82.69)	3.52 (5.67)	2001	4.68	0.434 (0.264)	15.94 (3.14)	187 (86)	64 (18)	28.66 (97.05)
7th Gear									
176.56 (131.66)	16602 (73.85)	3.99 (6.42)	1952	4.07	0.428 (0.260)	16.14 (3.18)	189 (87)	65 (18)	28.67 (97.09)
8th Gear									
172.76 (128.83)	14000 (62.28)	4.63 (7.45)	1953	3.10	0.438 (0.267)	15.77 (3.11)	188 (86)	60 (16)	28.66 (97.05)
9th Gear									
173.90 (129.68)	12182 (54.19)	5.35 (8.62)	1951	2.74	0.436 (0.265)	15.87 (3.13)	189 (87)	52 (11)	29.00 (98.12)
10th Gear									
174.85 (130.37)	10785 (47.97)	6.08 (9.78)	1947	2.38	0.433 (0.264)	15.95 (3.14)	188 (87)	52 (11)	29.01 (98.24)
11th Gear									
172.83 (128.88)	9219 (41.01)	7.03 (11.31)	1949	2.29	0.438 (0.267)	15.78 (3.11)	189 (87)	53 (12)	29.02 (98.27)
12th Gear									
179.11 (133.56)	8509 (37.85)	7.89 (12.70)	1953	1.93	0.424 (0.258)	16.32 (3.22)	188 (87)	54 (12)	29.04 (98.34)
13th Gear									
173.13 (129.10)	6622 (29.45)	9.80 (15.78)	1956	1.74	0.437 (0.266)	15.83 (3.12)	188 (87)	57 (14)	29.06 (98.41)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 141° F *(61° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 9710 lb *(4404 kg)*. The pull in 3rd gear (ballasted tractor) was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1622**, Summary 060, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
				3rd Gear					
147.00 (109.62)	25742 (114.5[illegible])	2.1[illegible] [illegible]	2200	9.1[illegible]	0.479 (0.291)	13.41 (2.64)	183 (84)	80 [illegible]	29.03 (98.3[illegible])
				4th Gear					
167.25 (124.72)	21027 (93.53)	2.98 (4.80)	2200	10.7[illegible]	0.456 (0.277)	13.84 (2.7[illegible])	180 (82)	75 (24)	28.84 (97.66)
				5th Gear					
170.97 (127.49)	18750 (83.40)	3.42 (5.50)	2200	3.68	0.446 (0.271)	14.1[illegible] (2.7[illegible])	187 (86)	75 (24)	28.85 (97.70)
				6th Gear					
173.11 (129.10)	16659 (74.1[illegible])	3.90 (6.27)	2200	2.96	0.440 (0.268)	14.2[illegible] (2.8[illegible])	180 (82)	73 (23)	28.86 (97.73)
				7th Gear					
171.80 (128.11)	14254 (63.40)	4.52 (7.27)	2197	3.37	0.443 (0.270)	14.2[illegible] (2.8[illegible])	180 (82)	61 (16)	28.87 (97.76)
				8th Gear					
167.23 (124.72)	11969 (53.24)	5.24 (8.43)	2200	2.74	0.437 (0.266)	14.3[illegible] (2.8[illegible])	180 (82)	60 (16)	29.00 (98.2[illegible])
				9th Gear					
166.86 (124.4[illegible])	10347 (46.0[illegible])	6.05 (9.74)	2196	2.29	[illegible]	[illegible]	187 (86)	[illegible]	29.0[illegible] (98.2[illegible])
				10th Gear					
167.80 (125.13)	9131 (40.61)	6.89 (11.09)	2201	2.02	[illegible]	[illegible]	187 (86)	72 (22)	29.01 (98.24)
				11th Gear					
166.86 (124.42)	7868 (34.99)	7.96 (12.81)	2200	1.77	0.438 (0.26[illegible])	14.08 (2.7[illegible])	180 (82)	54 (12)	29.03 (98.31)
				12th Gear					
170.68 (127.27)	7181 (31.94)	8.91 (14.34)	2200	1.83	0.447 (0.272)	13.93 (2.7[illegible])	180 (82)	56 (13)	29.05 (98.37)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear chosen to 4.7 mph (7.5 km/h)—7th Gear	76.[illegible]
Maximum sound level	77.[illegible]
Transport speed—no load—12th Gear	79.[illegible]
Bystander in 12th Gear	87.[illegible]

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2201	1981	1760	1539	1323	1104
Pull—lbs (kN)	9131 (40.61)	10579 (47.06)	11754 (52.28)	12731 (56.63)	12792 (56.90)	10434 (46.41)
Increase in Pull %	0	16	29	39	40	14
Power—Hp (kW)	167.80 (125.13)	174.63 (130.22)	171.96 (128.23)	162.45 (121.14)	140.26 (104.59)	95.90 (71.51)
Speed—Mph (km/h)	6.89 (11.09)	6.19 (9.96)	5.49 (8.83)	4.79 (7.70)	4.11 (6.62)	3.45 (5.55)
Slip %	2.02	2.29	2.47	2.83	2.83	2.47

TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi (kPa)	Four 20.8R42; **; 12 (83)	Two 20.8R42; **; 16 (110)
Ballast—Liquid (total)	1950 lb (887 kg)	None
—Cast Iron (total)	2000 lb (907 kg)	None
Front Tires—No., size, ply & psi (kPa)	Two 18.4R30; ***; 24 (165)	Two 18.4R30; ***; 24 (165)
Ballast—Liquid (total)	245 lb (111 kg)	None
—Cast Iron (total)	2100 lb (953 kg)	None
Height of Drawbar	20 in (510 mm)	19.0 in (483 mm)
Static Weight—Rear	15335 lb (6956 kg)	11830 lb (5366 kg)
—Front	9330 lb (4232 kg)	6540 lb (2966 kg)
—Total	24665 lb (11188 kg)	18370 lb (8332 kg)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2550 (176)
Location	remote outlet
Hydraulic oil temperature °F (°C)	124 (51)
Location	transmission sump
Category	III
Quick attach	Yes

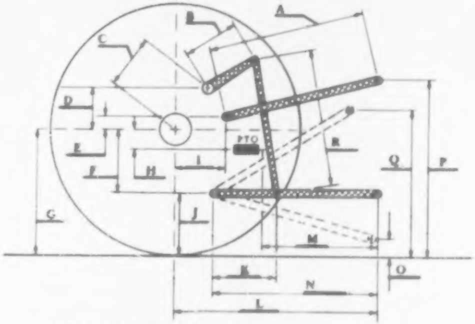
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb. kN	9860 43.9	10570 47.0	10854 48.3	10224 45.5	9411 41.9
		with 1-55 mm lift assist cylinder			
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb. kN	10518 46.8	11454 50.9	11576 51.5	10757 47.9	10041 44.7
		with 2-44 mm lift assist cylinders			
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb. kN	11573 51.5	11972 53.3	12216 54.3	11637 51.8	10603 47.2
		with 2-55 mm lift assist cylinders			
Hitch point distance to ground level in. (mm)	9.1 (231)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb. kN	12554 55.8	13426 59.7	13720 61.0	12728 56.6	11773 52.4

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: III
Quick Attach: Yes

Maximum Force Exerted Through Whole Range	6614 lbs (29.4 kN) *7057 lbs (31.4 kN) **7486 lbs (33.3 kN) ***8274 lbs (36.8 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2550 psi (176 Bar)
ii) Pump delivery rate at minimum pressure	30.6 GPM (115.8 l/min)
iii) Pump delivery rate at maximum hydraulic power	29.6 GPM (112.0 l/min)
Delivery pressure	1750 psi (121 Bar)
Power	30.2 Hp (22.5 kW)

*with 1-55 mm lift assist cylinder
**with 2-44 mm lift assist cylinders
***with 2-55 mm lift assist cylinders



HITCH DIMENSIONS AS TESTED—NO LOAD

John Deere 4955 Powershift Diesel

	inch	mm
A	28.1	714
B	18.4	468
C	12.9	327
D	12.9	327
E	6.8	172
F	13.0	330
G	36.1	918
H	7.0	177
I	15.1	384
J	23.1	588
K	28.2	716
L	44.3	1124
L'	49.3	1251
M	22.3	565
N	38.1	968
O	10.1	257
P	45.1	1146
Q	42.5	1080
R	37.3	946

L' to end of Quick Attach

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1623—SUMMARY 061
JOHN DEERE 8560 POWRSYNC DIESEL
24 SPEED ALSO 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—PTO speed—1100 rpm					
202.10 ([illegible])	2100	11.7[illegible] (44.7[illegible])	0.401 ([illegible])	17.2[illegible] ([illegible])	
Maximum Power (2 Hours)					
210.21 (156.76)	1900	11.69 (44.2[illegible])	0.384 ([illegible])	17.98 ([illegible])	
Standard Power Take-off Speed (1003 rpm)					
210.12 (156.69)	1900	11.69 (44.25)	0.382 ([illegible])	17.97 ([illegible])	
VARYING POWER AND FUEL CONSUMPTION					
202.50 ([illegible])	2100	11.7[illegible] (44.5[illegible])	0.40[illegible] ([illegible])	17.2[illegible] ([illegible])	Air temperature
178.77 ([illegible])	2196	10.81 (40.9[illegible])	0.420 (0.255)	16.48 (3.2[illegible])	74°F (23°C)
136.00 (101.4[illegible])	2211	9.42 (35.6[illegible])	0.478 (0.290)	14.45 (2.8[illegible])	Relative humidity
92.51 (68.8[illegible])	2243	7.07 (26.78)	0.530 (0.322)	13.05 (2.5[illegible])	41%
46.55 (34.7[illegible])	2272	4.90 (18.57)	0.728 (0.443)	9.49 (1.87)	Barometer
0.87 ([illegible])	2290	3.13 (11.85)	24.900 (15.1[illegible])	0.28 ([illegible])	29.01" Hg (98.24 kPa)

Maximum Torque 697 lb-ft (945 Nm) at 1350 rpm
Maximum Torque Rise [illegible]
Torque Rise at 1000 engine rpm 30%

DRAWBAR PERFORMANCE FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th (C3) Gear									
180.74 (134.78)	11162 (49.65)	6.07 (9.77)	2104	1.59	0.452 (0.275)	13.28 (2.62)	182 (83)	66 (19)	29.09 (98.51)
75% of Pull at Maximum Power—12th (C3) Gear									
142.24 (106.07)	8371 (37.24)	6.37 (10.25)	2197	1.14	0.490 (0.298)	14.12 (2.78)	182 (83)	75 (24)	29.08 (98.48)
50% of Pull at Maximum Power—12th (C3) Gear									
96.63 (72.06)	5580 (24.82)	6.49 (10.45)	2251	0.79	0.564 (0.343)	12.25 (2.41)	181 (83)	75 (24)	29.07 (98.44)
75% of Pull at Reduced Engine Speed—15th (B5) Gear									
142.57 (106.32)	8375 (37.25)	6.38 (10.27)	1774	1.14	0.449 (0.273)	15.39 (3.03)	182 (83)	75 (24)	29.08 (98.48)
50% of Pull at Reduced Engine Speed—15th (B5) Gear									
96.61 (72.04)	5581 (24.82)	6.49 (10.45)	1798	0.79	0.500 (0.304)	13.82 (2.72)	181 (83)	75 (24)	29.06 (98.41)

LUGGING ABILITY IN 12th (C3) GEAR

Crankshaft Speed rpm	2104	1893	1683	1474	1263	1054
Pull—lbs (kN)	11162 (49.65)	13090 (58.23)	14625 (65.06)	15388 (68.45)	15502 (68.96)	14989 (66.67)
Increase in Pull %	0	17	31	38	39	34
Power—Hp (kW)	180.74 (134.78)	190.05 (141.72)	188.41 (140.49)	172.94 (128.96)	149.30 (111.34)	120.47 (89.84)
Speed—Mph (km/h)	6.07 (9.77)	5.44 (8.76)	4.83 (7.77)	4.21 (6.78)	3.61 (5.81)	3.01 (4.85)
Slip %	1.59	2.02	2.20	2.28	2.28	2.28

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: May 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CE/SD **To motor** 5.719 gal *(21.649 l)* **Drained from motor** 5.414 gal *(20.494 l)* **Transmission, hydraulic and final drive lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 27 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *RG6076H102244* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 80.0-87.3 lb/hr *(36.3-39.6 kg/hr)* **High idle** 2225-2325 rpm **Turbo boost** nominal 15-18 psi *(103-124 kPa)* as measured 16.0 psi *(110 kPa)*

CHASSIS: Type four wheel drive with duals **Serial No.** *RW8560H001036* **Tread width** rear 73.7" *(1871 mm)* to 132.0" *(3352 mm)* front 73.7" *(1871 mm)* to 132.0" *(3352 mm)* **Wheel base** 133.9" *(3400 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 2.06 *(3.31)* second 2.47 *(3.98)* third 2.65 *(4.27)* fourth 3.18 *(5.12)* fifth 3.63 *(5.84)* sixth 4.35 *(7.00)* seventh 4.39 *(7.06)* eighth 4.84 *(7.79)* ninth 5.26 *(8.47)* tenth 5.65 *(9.10)* eleventh 5.80 *(9.34)* twelfth 6.23 *(10.03)* thirteenth 6.78 *(10.91)* fourteenth 7.47 *(12.02)* fifteenth 7.73 *(12.45)* sixteenth 8.53 *(13.72)* seventeenth 9.27 *(14.93)* eighteenth 10.22 *(16.45)* nineteenth 10.31 *(16.60)* twentieth 12.36 *(19.90)* twenty-first 13.28 *(21.37)* twenty-second 15.92 *(25.63)* twenty-third 18.18 *(29.25)* twenty-fourth 21.78 *(35.06)* reverse 2.47 *(3.98)*, 2.96 *(4.77)*, 5.26 *(8.47)*, 5.80 *(9.34)*, 6.31 *(10.16)*, 6.96 *(11.20)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 32075 lb *(14549 kg)*

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
1st (A1) Gear									
164.02 (122.31)	31879 (141.80)	1.93 (3.11)	2157	7.84	0.486 (0.296)	14.23 (2.80)	182 (83)	59 (15)	29.09 (98.51)
2nd (A2) Gear									
176.34 (131.50)	30280 (134.69)	2.18 (3.52)	2022	6.99	0.465 (0.283)	14.87 (2.93)	182 (83)	64 (18)	29.10 (98.54)
3rd (A3) Gear									
181.35 (135.23)	26833 ([illegible])	2.54 ([illegible])	2007	3.96	0.443 (0.27[illegible])	15.30 ([illegible])	182 (83)	68 (20)	29.11 (98.58)
4th (A4) Gear									
183.13 (136.56)	25154 (111.89)	2.73 (4.39)	1902	3.90	0.440 (0.268)	15.71 ([illegible])	181 (83)	61 (16)	29.12 ([illegible])
5th (A5) Gear									
183.92 ([illegible])	22805 ([illegible])	[illegible] ([illegible])	1900	3.31	0.439 (0.267)	15.74 ([illegible])	182 (83)	64 (18)	29.12 ([illegible])
6th (A6) Gear									
182.25 ([illegible])	18015 ([illegible])	3.79 ([illegible])	1904	2.65	0.444 (0.270)	15.57 ([illegible])	183 (84)	66 (19)	29.12 ([illegible])
7th (B1) Gear									
185.16 (138.07)	18190 (80.94)	3.82 (6.14)	1901	2.72	0.437 (0.266)	15.80 (3.11)	183 (84)	71 (22)	29.08 (98.48)
8th (C1) Gear									
186.64 (139.18)	16561 (73.67)	4.23 (6.80)	1903	2.46	0.434 (0.264)	15.93 (3.14)	183 (84)	70 (21)	29.08 (98.48)
9th (B2) Gear									
187.40 (139.75)	15245 (67.81)	4.61 (7.42)	1903	2.28	0.431 (0.262)	16.03 (3.16)	184 (84)	74 (23)	29.10 (98.54)
10th (B3) Gear									
188.70 (140.72)	14286 (63.55)	4.95 (7.97)	1904	1.94	0.428 (0.261)	16.14 (3.18)	183 (84)	65 (18)	29.10 (98.54)
11th (C2) Gear									
186.19 (138.84)	13720 (61.03)	5.09 (8.19)	1905	1.85	0.434 (0.264)	15.91 (3.13)	183 (84)	69 (21)	29.10 (98.54)
12th (C3) Gear									
189.88 (141.60)	13006 (57.85)	5.48 (8.81)	1904	1.76	0.426 (0.259)	16.21 (3.19)	183 (84)	69 (21)	29.10 (98.54)
13th (B4) Gear									
183.80 (137.06)	11527 (51.27)	5.98 (9.62)	1907	1.67	0.438 (0.266)	15.78 (3.11)	183 (84)	70 (21)	29.09 (98.51)
14th (C4) Gear									
187.01 (139.45)	10636 (47.31)	6.59 (10.61)	1904	1.67	0.432 (0.263)	16.00 (3.15)	183 (84)	68 (20)	29.13 (98.65)
15th (B5) Gear									
187.44 (139.77)	10299 (45.81)	6.83 (10.98)	1901	1.50	0.431 (0.262)	16.05 (3.16)	184 (84)	68 (20)	29.13 (98.65)
16th (C5) Gear									
185.17 (138.08)	9203 (40.93)	7.55 (12.14)	1903	1.32	0.437 (0.266)	15.83 (3.12)	184 (84)	69 (21)	29.13 (98.65)
17th (B6) Gear									
180.51 (134.61)	8236 (36.64)	8.22 (13.22)	1903	1.14	0.447 (0.272)	15.46 (3.05)	184 (84)	72 (22)	29.13 (98.65)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 149° F (65° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 1st (A1) gear was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1623**, Summary 061, December 22, 1989.

LOUIS I. LEVITICUS
Engineer in Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2100 RPM

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Air dry bulb	Barom. inch Hg (kPa)
					1st (A1) Gear				
162.63 (121.27)	32166 (143.08)	1.90 (3.05)	2152	9.06	0.492 (0.300)	14.04 (2.77)	182 (83)	62 (17)	29.09 (98.51)
					2nd (A2) Gear				
174.41 (130.06)	28508 (126.81)	2.31 (3.72)	2098	3.51	0.467 (0.284)	14.79 (2.91)	182 (83)	64 (18)	29.10 (98.54)
					3rd (A3) Gear				
178.04 (132.76)	26747 (118.97)	2.50 (4.02)	2101	4.74	0.457 (0.278)	15.11 (2.98)	182 (83)	66 (19)	29.11 (98.58)
					4th (A4) Gear				
177.90 (132.66)	21858 (97.23)	3.05 (4.90)	2101	3.18	0.458 (0.279)	15.08 (2.97)	183 (83)	55 (13)	29.12 (98.61)
					5th (A5) Gear				
177.65 (132.48)	19072 (84.83)	3.49 (5.62)	2104	2.72	0.458 (0.279)	15.10 (2.97)	182 (83)	63 (17)	29.12 (98.61)
					6th (A6) Gear				
175.26 ([illegible])	15623 (69.50)	4.21 (6.77)	2102	2.31	0.464 (0.282)	14.90 (2.94)	183 (84)	66 (19)	29.12 (98.61)
					7th (B1) Gear				
179.74 ([illegible])	15938 ([illegible])	4.23 ([illegible])	2099	2.37	0.452 (0.275)	15.29 (3.01)	182 (83)	70 (21)	29.08 (98.48)
					8th (C1) Gear				
178.74 (133.28)	14314 (63.67)	4.68 (7.54)	2101	2.02	0.456 (0.278)	15.14 (2.98)	183 (84)	70 (21)	29.08 (98.48)
					9th (B2) Gear				
178.72 (133.27)	13115 (58.34)	5.11 (8.22)	2103	1.94	0.457 (0.278)	15.12 (2.98)	183 (84)	70 (21)	29.09 (98.51)
					10th (B3) Gear				
180.64 (134.70)	12349 (54.93)	5.49 (8.83)	2100	1.67	0.451 (0.274)	15.34 (3.02)	182 (83)	67 (19)	29.10 (98.54)
					11th (C2) Gear				
178.42 (133.04)	11852 (52.72)	5.65 (9.09)	2104	1.67	0.456 (0.277)	15.15 (2.99)	183 (84)	69 (21)	29.10 (98.54)
					12th (C3) Gear				
180.74 (134.78)	11152 (49.61)	6.07 (9.77)	2104	1.59	0.452 (0.275)	15.28 (3.01)	182 (83)	69 (21)	29.09 (98.51)
					13th (B4) Gear				
176.29 (131.46)	10003 (44.50)	6.61 (10.64)	2101	1.50	0.463 (0.282)	14.92 (2.94)	182 (83)	70 (21)	29.09 (98.51)
					14th (C4) Gear				
177.20 (132.14)	9117 (40.55)	7.29 (11.73)	2100	1.32	0.458 (0.279)	15.08 (2.97)	183 (84)	68 (20)	29.12 (98.61)
					15th (B5) Gear				
177.59 (132.43)	8817 (39.22)	7.55 (12.16)	2101	1.25	0.458 (0.279)	15.09 (2.97)	183 (84)	68 (20)	29.15 (98.71)
					16th (C5) Gear				
176.55 (131.65)	7934 (35.29)	8.34 (13.43)	2100	1.05	0.462 (0.281)	14.97 (2.95)	183 (84)	68 (20)	29.15 (98.71)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—8th (C1) Gear	76.5
Maximum sound level	76.5
Transport speed—no load—24th (D6) Gear	76.5
Bystander in 24th (D6) Gear	87.0

THREE POINT HITCH PERFORMANCE (SAE Static Test)

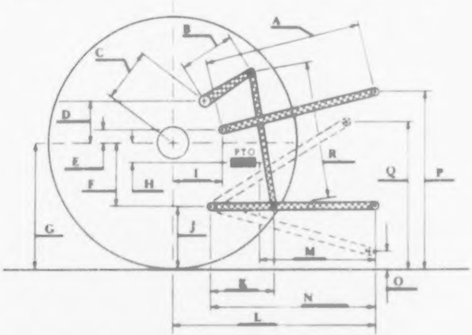
Observed Maximum Pressure psi (bar)	2500 (172)
Location	remote outlet
Hydraulic oil temperature °F (°C)	145 (63)
Location	hydraulic sump
Category	III
Quick attach	Yes

Hitch point distance to ground level in (mm)	8.9 (226)	16.2 (411)	26.4 (671)	34.4 (874)	40.2 (1021)
Lift force on frame lb (kN)	16075 (71.5)	16358 (72.8)	16417 (73.0)	15822 (70.4)	14983 (66.6)

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4R42; [illegible]
Front Tires	—No., size, ply & psi (kPa)	Four 18.4R42; [illegible]
Height of Drawbar		18 in. (457 mm)
Static Weight	—Rear	[illegible] lb ([illegible] kg)
	—Front	[illegible] lb ([illegible] kg)
	—Total	[illegible] lb ([illegible] kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III	
Quick Attach: Yes	
Maximum Force Exerted Through Whole Range	11506 lb (51.2 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2500 psi (172 Bar)
ii) Pump delivery rate at minimum pressure	43.6 GPM (165.1 l/min)
iii) Pump delivery rate at maximum hydraulic power	41.0 GPM (155.2 l/min)
Delivery pressure	1850 psi (128 Bar)
Power	44.3 Hp (33.0 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.5	800
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	35.1	892
H	4.8	122
I	22.7	577
J	21.3	542
K	28.8	731
L	55.3	1405
L	61.8	1570
M	25.4	645
N	44.0	1117
O	7.9	201
P	48.3	1228
Q	40.3	1024
R	44.8	1137

1 to end of Quick attach

John Deere 8560 Powrsync Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1624—SUMMARY 062
JOHN DEERE 8760 POWRSYNC DIESEL
24 SPEED ALSO 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1109 rpm)					
256.94 (191.60)	2100	15.78 (59.71)	0.425 (0.257)	16.28 (3.21)	
Maximum Power (2 Hours)					
277.42 (206.87)	1900	16.07 (60.83)	0.401 (0.244)	17.26 (3.40)	
Standard Power Take-off Speed (1003 rpm)					
277.43 (206.88)	1900	16.08 (60.88)	0.401 (0.244)	17.25 (3.40)	
VARYING POWER AND FUEL CONSUMPTION					
256.94 (191.60)	2100	15.78 (59.71)	0.425 (0.257)	16.28 (3.21)	Air temperature
227.57 (169.70)	2190	14.71 (55.70)	0.447 (0.272)	15.47 (3.05)	75°F (24°C)
172.72 (128.79)	2214	12.02 (45.51)	0.481 (0.293)	14.37 (2.83)	Relative humidity
116.09 (86.57)	2235	8.94 (33.85)	0.532 (0.324)	12.98 (2.56)	60%
58.75 (43.81)	2256	6.94 (26.29)	0.817 (0.497)	8.46 (1.67)	Barometer
0.57 (0.43)	2281	4.25 (16.10)	[illegible] ([illegible])	0.13 (0.03)	29.06" Hg (98.42 kPa)

Maximum Torque 904 lb.-ft. (1225 Nm) at 1450 rpm
Maximum Torque Rise 40.6%
Torque Rise at 1900 engine rpm 24%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing med	Temp °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th (C3) Gear									
237.21 (176.89)	14748 (65.60)	6.03 (9.71)	2100	1.86	0.462 (0.281)	14.97 (2.95)	186 (86)	67 (19)	28.78 (97.46)
75% of Pull at Maximum Power—12th (C3) Gear									
187.25 (139.62)	11069 (49.24)	6.34 (10.21)	2202	1.59	0.492 (0.299)	14.05 (2.77)	186 (86)	74 (23)	28.60 (96.85)
50% of Pull at Maximum Power—12th (C3) Gear									
126.71 (94.49)	7376 (32.81)	6.44 (10.37)	2224	0.98	0.564 (0.343)	12.26 (2.42)	183 (84)	74 (23)	28.59 (96.82)
75% of Pull at Reduced Engine Speed—15th (B5) Gear									
186.95 (139.41)	11064 (49.21)	6.34 (10.20)	1775	1.68	0.438 (0.267)	15.78 (3.11)	188 (86)	[illegible]	28.60 (96.85)
50% of Pull at Reduced Engine Speed—15th (B5) Gear									
126.91 (94.64)	7378 (32.82)	6.45 (10.38)	1792	0.98	0.488 (0.297)	14.15 (2.79)	181 (83)	76 (24)	28.59 (96.82)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: May, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8301 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 6.928 gal *(26.226 l)* **Drained from motor** 6.698 gal *(25.355 l)* **Transmission, hydraulic and final drive lubricant** John Deere HyGard fluid **Total time engine was operated** 26.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *RG6101H100194* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 5.12" × 5.00" *(130.0 mm × 127.0 mm)* **Compression ratio** 15.2 to 1 **Displacement** 619 cu in *(10144 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** 3 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 106.1-115.9 lb/hr *(48.1-52.6 kg/hr)* **High idle** 2225-2325 rpm **Turbo boost** nominal 18-22 psi *(124-152 kPa)* as measured 18.5 psi *(128 kPa)*

CHASSIS: Type four wheel drive with duals **Serial No.** *RW8760H001217* **Tread width** rear 73.7" *(1871 mm)* to 132.0" *(3352 mm)* front 73.7" *(1871 mm)* to 132.0" *(3352 mm)* **Wheel base** 133.9" *(3400 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.06 *(3.31)* second 2.47 *(3.98)* third 2.65 *(4.27)* fourth 3.18 *(5.12)* fifth 3.63 *(5.84)* sixth 4.35 *(7.00)* seventh 4.39 *(7.06)* eighth 4.84 *(7.79)* ninth 5.26 *(8.47)* tenth 5.65 *(9.10)* eleventh 5.80 *(9.34)* twelfth 6.23 *(10.03)* thirteenth 6.78 *(10.91)* fourteenth 7.47 *(12.02)* fifteenth 7.73 *(12.45)* sixteenth 8.53 *(13.72)* seventeenth 9.27 *(14.93)* eighteenth 10.22 *(16.45)* nineteenth 10.31 *(16.60)* twentieth 12.36 *(19.90)* twenty-first 13.28 *(21.37)* twenty-second 15.92 *(25.63)* twenty-third 18.18 *(29.25)* twenty-fourth 21.78 *(35.06)* reverse 2.47 *(3.98)*, 2.96 *(4.77)*, 5.26 *(8.47)*, 5.80 *(9.34)*, 6.31 *(10.16)*, 6.96 *(11.20)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 32695 lb *(14830 kg)*

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cool-ing med	Temp °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
215.92 (161.01)	32766 (145.75)	2.47 (3.98)	2155	7.91	0.502 (0.305)	13.78 (2.71)	185 (85)	57 (14)	28.60 (96.85)
4th (A4) Gear									
230.17 (171.64)	30738 (136.73)	2.81 (4.52)	2010	6.43	0.477 (0.290)	14.50 (2.86)	185 (85)	62 (17)	28.61 (96.88)
5th (A5) Gear									
239.73 (178.77)	28069 (124.85)	3.20 (5.15)	1974	4.50	0.455 (0.277)	15.19 (2.99)	186 (86)	64 (18)	28.62 (96.92)
6th (A6) Gear									
246.51 (183.82)	24773 (110.20)	3.73 (6.01)	1900	3.09	0.448 (0.272)	15.44 (3.04)	190 (88)	70 (21)	28.63 (96.95)
7th (B1) Gear									
249.96 ([illegible])	24913 (110.82)	3.76 (6.05)	1897	3.06	0.442 (0.269)	15.64 (3.08)	187 (86)	70 (21)	28.64 (96.99)
8th (C1) Gear									
254.65 (189.89)	22815 (101.48)	4.19 (6.74)	1901	3.23	0.435 (0.264)	15.90 (3.13)	188 (87)	68 (20)	28.80 (97.53)
9th (B2) Gear									
253.85 (189.29)	20826 (92.64)	4.57 (7.36)	1903	2.81	0.436 (0.265)	15.84 (3.12)	189 (87)	68 (20)	28.80 (97.53)
10th (B3) Gear									
255.84 (190.78)	19528 (86.86)	4.91 (7.91)	1901	2.64	0.434 (0.264)	15.95 (3.14)	189 (87)	69 (21)	28.79 (97.49)
11th (C2) Gear									
253.30 (188.88)	18793 (83.59)	5.05 (8.13)	1901	2.46	0.438 (0.267)	15.77 (3.11)	190 (88)	68 (20)	28.78 (97.46)
12th (C3) Gear									
256.26 (191.09)	17664 (78.57)	5.44 (8.76)	1902	2.20	0.434 (0.264)	15.93 (3.14)	189 (87)	67 (19)	28.78 (97.46)
13th (B4) Gear									
252.78 (188.50)	16000 (71.17)	5.92 (9.53)	1901	2.05	0.439 (0.267)	15.75 (3.10)	190 (88)	68 (20)	28.78 (97.46)
14th (C4) Gear									
252.51 (188.15)	14441 (64.24)	6.55 (10.54)	1902	1.77	0.440 (0.268)	15.70 (3.09)	191 (88)	70 (21)	28.79 (97.49)
15th (B5) Gear									
253.18 (188.80)	13999 (62.27)	6.78 (10.92)	1900	1.77	0.437 (0.266)	15.81 (3.12)	190 (88)	70 (21)	28.79 (97.49)
16th (C5) Gear									
253.92 (189.35)	12702 (56.50)	7.50 (12.06)	1902	1.59	0.438 (0.266)	15.78 (3.11)	191 (88)	69 (21)	28.79 (97.49)
17th (B6) Gear									
245.62 (183.16)	11284 (50.19)	8.16 (13.14)	1903	1.42	0.451 (0.274)	15.35 (3.02)	191 (88)	69 (21)	28.80 (97.53)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 146° F (63° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 3rd gear was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1624**, Summary 062, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2100 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
				3rd (A3) Gear					
216.70 (161.59)	32880 (146.26)	2.47 (3.98)	2133	7.84	0.500 (0.304)	13.81 (2.72)	185 (85)	37 (3)	28.60 (96.85)
				4th (A4) Gear					
224.63 (167.51)	28530 (126.91)	2.95 (4.75)	2100	5.79	0.480 ([illegible])	14.21 (2.80)	187 (86)	70 ([illegible])	28.62 (96.92)
				5th (A5) Gear					
228.64 (170.50)	24990 (111.20)	3.43 (5.52)	2101	4.21	0.476 (0.290)	14.32 (2.82)	187 (86)	70 (21)	28.62 (96.92)
				6th (A6) Gear					
230.35 (171.77)	20727 (92.20)	4.17 (6.71)	2101	2.98	0.475 (0.289)	14.36 (2.83)	188 (87)	70 (21)	28.63 (96.95)
				7th (B1) Gear					
238.39 (177.77)	21257 (94.56)	4.21 (6.77)	2101	2.98	0.457 (0.278)	15.11 (2.98)	187 (86)	70 (21)	28.64 (96.99)
				8th (C1) Gear					
240.25 (179.16)	19465 (86.14)	4.65 (7.49)	2099	2.40	0.454 (0.276)	15.23 (3.00)	188 (87)	68 (20)	28.80 (97.53)
				9th (B2) Gear					
236.68 (176.49)	17468 (77.70)	5.08 (8.18)	2103	2.20	0.464 (0.282)	14.91 (2.94)	189 (87)	68 (20)	28.80 (97.53)
				10th (B3) Gear					
239.24 (178.40)	16443 (73.14)	5.46 (8.78)	2100	2.03	0.459 (0.279)	15.07 (2.97)	188 (87)	69 (21)	28.78 (97.46)
				11th (C2) Gear					
236.14 (176.09)	15777 (70.18)	5.61 (9.03)	2101	1.94	0.466 (0.283)	14.85 (2.92)	187 (86)	67 (19)	28.78 (97.46)
				12th (C3) Gear					
237.21 (176.89)	14748 (65.60)	6.03 (9.71)	2100	1.86	0.462 (0.281)	14.97 (2.95)	186 (86)	67 (19)	28.78 (97.46)
				13th (B4) Gear					
234.49 (174.86)	13402 (59.61)	6.56 (10.56)	2097	1.77	0.467 (0.284)	14.80 (2.92)	188 (87)	69 (21)	28.78 (97.46)
				14th (C4) Gear					
233.24 (173.93)	12062 (53.65)	7.25 (11.67)	2100	1.51	0.468 (0.285)	14.77 (2.91)	188 (87)	70 (21)	28.79 (97.49)
				15th (B5) Gear					
234.35 (174.76)	11686 (51.98)	7.52 (12.10)	2100	1.51	0.466 (0.283)	14.83 (2.92)	190 (88)	70 (21)	28.79 (97.49)
				16th (C5) Gear					
233.79 (174.34)	10565 (46.99)	8.30 (13.36)	2099	1.33	0.469 (0.285)	14.75 (2.91)	189 (87)	70 (21)	28.79 (97.49)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—8th (C1) Gear	76.0
Maximum sound level	76.5
Transport speed—no load—24th (D6) Gear	75.0
Bystander in 24th (D6) Gear	87.0

LUGGING ABILITY IN 12th (C3) GEAR

Crankshaft Speed rpm	2100	1890	1679	1469	1258	1054
Pull—lbs (kN)	14748 (65.60)	17729 (78.86)	19632 (87.33)	20796 (92.51)	20266 (90.15)	18806 (83.65)
Increase in Pull %	0	20	33	41	37	28
Power—Hp (kW)	237.25 (176.92)	255.30 (190.38)	250.48 (186.78)	231.47 (172.61)	193.37 (144.20)	150.34 (112.11)
Speed—Mph (km/h)	6.03 (9.71)	5.40 (8.69)	4.78 (7.70)	4.17 (6.72)	3.58 (5.76)	3.00 (4.82)
Slip %	1.86	2.29	2.64	2.81	2.81	2.64

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4R42; **; 14 (95)
Front Tires	—No., size, ply & psi (kPa)	Four 18.4R42; **; 14 (95)
Height of Drawbar		18 in (455 mm)
Static Weight	—Rear	14295 lb (6480 kg)
	—Front	18410 lb (8350 kg)
	—Total	32695 lb (14830 kg)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2580 (178)
Location	remote outlet
Hydraulic oil temperature °F (°C)	153 (67)
Location	hydraulic sump
Category	III
Quick attach	Yes

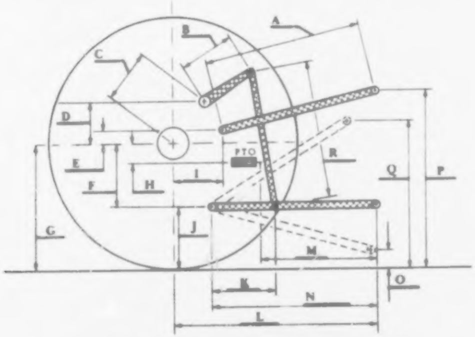
Hitch point distance to ground level in (mm)	8.9 (226)	16.2 (412)	26.4 (671)	34.4 (874)	40.2 (1021)
Lift force on frame lb (kN)	16075 (71.5)	16358 (72.8)	16417 ([illegible])	15822 ([illegible])	13083 ([illegible])

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range	11613 lbs (51.7 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2580 psi (178 Bar)
ii) Pump delivery rate at minimum pressure	17.5 GPM (66.2 l/min)
iii) Pump delivery rate at maximum hydraulic power	15.2 GPM (57.5 l/min)
Delivery pressure	1960 psi (135 Bar)
Power	16.1 Hp (12.0 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.5	800
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	35.1	892
H	4.8	122
I	22.7	577
J	21.3	542
K	28.8	731
L	55.3	1405
L*	61.8	1570
M	25.4	645
N	44.0	1117
O	7.9	201
P	48.3	1228
Q	40.3	1024
R	44.8	1137

L* to end of Quick attach

John Deere 8760 Powrsync Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1625—SUMMARY 063
JOHN DEERE 8960 POWRSYNC DIESEL
24 SPEED ALSO 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
333.40 (248.61)	1900	19.52 (73.88)	0.405 (0.246)	17.08 (3.36)	
Maximum Power (2 Hours)					
335.34 (250.06)	1800	19.24 (72.84)	0.397 (0.241)	17.43 (3.43)	

VARYING POWER AND FUEL CONSUMPTION

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
333.40 (248.61)	1900	19.52 (73.88)	0.405 (0.246)	17.08 (3.36)	Air temperature
300.35 (223.97)	2016	18.62 (70.48)	0.428 (0.261)	16.14 (3.18)	77°F (25°C)
230.06 (171.56)	2039	15.41 (58.33)	0.463 (0.282)	14.93 (2.94)	Relative humidity
155.12 (115.67)	2077	11.50 (43.54)	0.513 (0.312)	13.49 (2.66)	22%
78.21 (58.32)	2099	8.72 (33.02)	0.771 (0.469)	8.97 (1.77)	Barometer
0.54 (0.40)	2139	5.30 (20.06)	68.105 (41.427)	0.10 (0.02)	29.08" Hg (98.48 kPa)

Maximum Torque 1268 lb.-ft. (1719 Nm) at 1248 rpm
Maximum Torque Rise 37.6%
Torque Rise at 1500 engine rpm 28%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—10th (B3) Gear									
308.26 (229.87)	19700 (87.63)	5.87 (9.44)	1898	2.22	0.431 (0.262)	16.03 (3.16)	186 (86)	68 (20)	28.92 (97.93)
75% of Pull at Maximum Power—10th (B3) Gear									
250.39 (186.71)	14792 (65.80)	6.35 (10.22)	2044	1.86	0.485 (0.295)	14.26 (2.81)	186 (86)	77 (25)	28.84 (97.66)
50% of Pull at Maximum Power—10th (B3) Gear									
170.35 (127.02)	9851 (43.82)	6.48 (10.44)	2075	1.22	0.551 (0.335)	12.55 (2.47)	181 (83)	77 (25)	28.82 (97.60)
75% of Pull at Reduced Engine Speed—13th (B4) Gear									
249.73 (186.22)	14765 (65.68)	6.34 (10.21)	1703	1.68	0.432 (0.263)	16.01 (3.15)	186 (86)	77 (25)	28.84 (97.66)
50% of Pull at Reduced Engine Speed—13th (B4) Gear									
170.63 (127.24)	9859 (43.86)	6.49 (10.45)	1732	1.31	0.488 (0.297)	14.16 (2.79)	182 (83)	79 (26)	28.81 (97.56)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: May-June, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8501 **Fuel weight** 6.912 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 7.757 gal *(29.362 l)* **Drained from motor** 7.249 gal *(27.442 l)* **Transmission, hydraulic and final drive lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 31.5 hours

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 11511016 **Crankshaft** lengthwise **Rated engine speed** 1900 **Bore and stroke** (as specified) 5.50" × 6.00" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.0 to 1 **Displacement** 855 cu in *(14011 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Fuel cooler** radiator for injection pump return fuel **Muffler** vertical **Cooling medium temperature control** one thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 130.2-142.1 lb/hr *(59.0-64.5 kg/hr)* **High idle** 2080-2180 rpm **Turbo boost** nominal 19-23 psi *(131-159 kPa)* as measured 21.5 psi *(148 kPa)*

CHASSIS: Type four wheel drive with duals **Serial No.** *RW8960H001019* **Tread width** rear 78.8" *(2002 mm)* to 144.1" *(3659 mm)* front 78.8" *(2002 mm)* to 144.1" *(3659 mm)* **Wheel base** 133.9" *(3400 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.19 *(3.53)* second 2.63 *(4.23)* third 2.82 *(4.54)* fourth 3.38 *(5.45)* fifth 3.86 *(6.22)* sixth 4.63 *(7.45)* seventh 4.67 *(7.52)* eighth 5.15 *(8.29)* ninth 5.60 *(9.01)* tenth 6.01 *(9.68)* eleventh 6.18 *(9.94)* twelfth 6.63 *(10.67)* thirteenth 7.21 *(11.60)* fourteenth 7.95 *(12.79)* fifteenth 8.23 *(13.25)* sixteenth 9.08 *(14.60)* seventeenth 9.87 *(15.89)* eighteenth 10.88 *(17.51)* nineteenth 10.97 *(17.66)* twentieth 13.16 *(21.18)* twenty-first 14.13 *(22.77)* twenty-second 16.95 *(27.27)* twenty-third 19.34 *(31.12)* twenty-fourth 23.19 *(37.32)* reverse 2.63 *(4.23)*, 3.15 *(5.07)*, 5.60 *(9.01)*, 6.18 *(9.94)*, 6.72 *(10.81)*, 7.41 *(11.92)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1003 rpm at 1900 engine rpm **Unladen tractor mass** 35570 lb *(16134 kg)*

DRAWBAR PERFORMANCE AT 1800 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
4th (A4) Gear									
278.85 (207.94)	34462 (153.29)	3.03 (4.88)	1883	9.25	0.472 (0.287)	14.64 (2.88)	186 (85)	69 (21)	28.94 (98.00)
5th (A5) Gear									
286.38 (213.56)	30187 (134.28)	3.56 (5.73)	1861	5.87	0.456 (0.277)	15.16 (2.99)	186 (86)	73 (23)	28.92 (97.93)
6th (A6) Gear									
295.96 (220.70)	26288 (116.93)	4.19 (6.75)	1799	4.34	0.442 (0.269)	15.63 (3.08)	187 (86)	76 (24)	28.92 (97.93)
7th (B1) Gear									
301.33 (224.70)	26611 (118.37)	4.25 (6.84)	1800	3.90	0.432 (0.263)	16.02 (3.16)	186 (85)	70 (21)	28.87 (97.77)
8th (C1) Gear									
300.12 (223.80)	23972 (106.63)	4.69 (7.56)	1796	3.47	0.434 (0.264)	15.94 (3.14)	187 (86)	76 (24)	28.80 (97.53)
9th (B2) Gear									
304.72 (227.23)	22208 (98.78)	5.15 (8.28)	1800	3.02	0.427 (0.260)	16.18 (3.19)	190 (88)	76 (24)	28.81 (97.56)
10th (B3) Gear									
310.49 (231.53)	20988 (93.36)	5.55 (8.93)	1799	2.49	0.423 (0.257)	16.35 (3.22)	188 (86)	68 (20)	28.92 (97.93)
11th (C2) Gear									
301.82 (225.06)	19858 (88.33)	5.70 (9.17)	1800	2.49	0.429 (0.261)	16.12 (3.18)	187 (86)	70 (21)	28.88 (97.80)
12th (C3) Gear									
307.52 (229.31)	18772 (83.50)	6.14 (9.89)	1803	2.22	0.423 (0.257)	16.34 (3.22)	187 (86)	72 (22)	28.87 (97.77)
13th (B4) Gear									
305.09 (227.51)	17080 (75.98)	6.70 (10.78)	1803	2.04	0.425 (0.259)	16.25 (3.20)	188 (87)	73 (23)	28.85 (97.70)
14th (C4) Gear									
305.04 (227.47)	15482 (68.87)	7.39 (11.89)	1799	1.86	0.427 (0.260)	16.18 (3.19)	190 (88)	74 (23)	28.84 (97.66)
15th (B5) Gear									
306.49 (228.55)	14986 (66.66)	7.67 (12.34)	1802	1.68	0.425 (0.259)	16.25 (3.20)	188 (87)	74 (23)	28.83 (97.63)
16th (C5) Gear									
304.70 (227.21)	13481 (59.96)	8.48 (13.64)	1803	1.49	0.427 (0.260)	16.17 (3.19)	188 (87)	76 (24)	28.82 (97.60)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 102° F *(39° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 3rd (A3) and 4th (A4) gears was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1625**, Summary 063, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
248.90	34316	2.71	1902	9.87	0.500	13.83	185	72	28.91
([illegible])	(152.64)	(4.36)			(0.304)	(2.72)	(85)	(22)	([illegible])
4th (A4) Gear									
282.10	33574	3.14	1898	7.02	0.471	14.59	186	64	28.91
([illegible])	(149.34)	(5.05)			(0.286)	(2.88)	(85)	(18)	([illegible])
5th (A5) Gear									
287.35	29177	3.67	1898	5.85	0.467	14.88	186	[illegible]	28.91
([illegible])	([illegible])	(5.90)			(0.284)	(2.93)	(85)	([illegible])	([illegible])
6th (A6) Gear									
293.06	24704	4.44	1895	3.82	0.455	15.25	187	73	28.92
([illegible])	(109.89)	(7.15)			(0.276)	(3.00)	(86)	(23)	(97.93)
7th (B1) Gear									
303.49	25262	4.51	1898	3.47	0.440	15.72	186	74	28.86
(226.31)	(112.37)	(7.25)			(0.267)	(3.10)	(85)	(23)	(97.73)
8th (C1) Gear									
299.47	22541	4.98	1899	3.20	0.444	15.58	187	77	28.80
(223.31)	(100.27)	(8.02)			(0.270)	(3.07)	(86)	(25)	(97.53)
9th (B2) Gear									
302.33	20826	5.44	1897	2.45	0.439	15.74	187	68	28.91
(225.45)	(92.64)	(8.76)			(0.267)	(3.10)	(86)	(20)	(97.90)
10th (B3) Gear									
308.26	19700	5.87	1898	2.22	0.431	16.05	186	68	28.92
(229.87)	(87.63)	(9.44)			(0.262)	(3.16)	(86)	(20)	(97.93)
11th (C2) Gear									
298.67	18552	6.04	1901	2.15	0.444	15.57	187	70	28.89
(222.72)	(82.52)	(9.72)			(0.270)	(3.07)	(86)	(21)	(97.83)
12th (C3) Gear									
301.98	17472	6.48	1899	2.13	0.437	15.80	187	72	28.86
(225.19)	(77.72)	(10.43)			(0.266)	(3.11)	(86)	(22)	(97.73)
13th (B4) Gear									
298.20	15815	7.07	1900	1.77	0.444	15.55	187	74	28.84
(222.37)	(70.35)	(11.38)			(0.270)	(3.06)	(86)	(23)	(97.66)
14th (C4) Gear									
299.52	14369	7.82	1901	1.68	0.444	15.58	187	74	28.83
(223.36)	(63.92)	(12.58)			(0.270)	(3.07)	(86)	(23)	(97.63)
15th (B5) Gear									
300.57	13922	8.09	1898	1.49	0.442	15.65	187	74	28.82
(223.98)	(61.93)	(13.02)			(0.269)	(3.08)	(86)	(23)	(97.60)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—7th (B1) Gear	74.0
Maximum sound level	77.0
Transport speed—no load—24th (D6) Gear	75.0
Bystander in 24th (D6) Gear	87.0

LUGGING ABILITY IN 12th (C3) GEAR

Crankshaft Speed rpm	1899	1712	1519	1335	1134	951
Pull—lbs (kN)	17472 (77.72)	19540 (86.92)	21692 (96.49)	23689 (105.37)	24115 (107.26)	22134 (98.46)
Increase in Pull %	0	12	24	36	38	27
Power—Hp (kW)	301.98 (225.19)	303.56 (226.38)	297.66 (221.97)	283.81 (211.64)	245.38 (182.98)	189.64 (141.42)
Speed—Mph (km/h)	6.48 (10.43)	5.83 (9.38)	5.15 (8.28)	4.49 (7.23)	3.82 (6.14)	3.21 (5.17)
Slip %	2.13	2.58	2.76	3.29	3.47	3.11

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2540 (175)
Location	remote outlet
Hydraulic oil temperature °F (°C)	137 (58)
Location	hydraulic sump
Category	IV
Quick attach	Yes

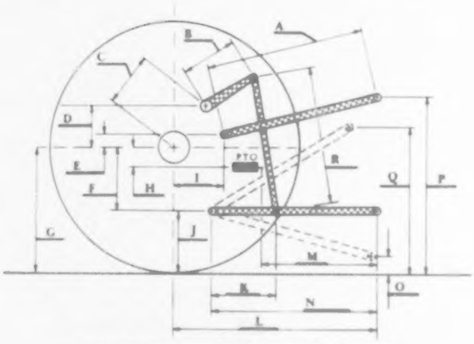
Hitch point distance to ground level in. (mm)	9.0 (229)	18.8 (477)	26.4 (670)	38.4 (975)	46.0 (1168)
Lift force on frame lb (kN)	15978 (71.1)	16360 (72.8)	16514 (73.5)	15334 (68.2)	13968 (62.1)

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	[illegible]	[illegible]
Front Tires	[illegible]	[illegible]
Height of Drawbar		[illegible] mm
Static Weight	Rear	[illegible] kg
	Front	[illegible] kg
	Total	[illegible] kg

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: IV
Quick Attach: Yes

Maximum Force Exerted Through Whole Range:	[illegible] lbs (55.4 kN)
i) Opening pressure of relief valve:	NA
Sustained pressure with pump stalled:	2540 psi (175 Bar)
ii) Pump delivery rate at minimum pressure:	[illegible] GPM ([illegible] l/min)
iii) Pump delivery rate at maximum hydraulic power:	38.2 GPM (144.6 l/min)
Delivery pressure:	1930 psi (134 Bar)
Power:	43.5 Hp (32.4 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.0	787
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	36.1	918
H	4.8	122
I	22.7	577
J	22.3	568
K	28.3	718
L	54.5	1385
L'	60.5	1537
M	24.6	625
N	43.2	1097
O	8.9	226
P	49.3	1254
Q	40.9	1039
R	44.6	1133

L' to end of Quick attach.

John Deere 8960 Powrsync Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1626—SUMMARY 064
JOHN DEERE 4055 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—PTO speed—1002 rpm					
108.7[illegible] (81.[illegible])	2200	6.7[illegible] (25.[illegible])	0.4[illegible] ([illegible])	16.0[illegible] ([illegible])	
Maximum Power (2 Hours)					
[illegible] ([illegible])	[illegible]	[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	
VARYING POWER AND FUEL CONSUMPTION					
108.7[illegible] (81.[illegible])	2200	6.7[illegible] (25.[illegible])	0.4[illegible] ([illegible])	16.0[illegible] ([illegible])	Air temperature [illegible]
98.[illegible] (73.[illegible])	2290	6.34 (24.[illegible])	[illegible] ([illegible])	[illegible] ([illegible])	Relative humidity [illegible]
7[illegible] (5[illegible])	2308	[illegible] ([illegible])	[illegible]	[illegible] ([illegible])	[illegible]
49.9[illegible] (3[illegible])	2328	4.3[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	Barometer
24.84 (18.[illegible])	2344	3.3[illegible] (12.[illegible])	[illegible] ([illegible])	7.[illegible] ([illegible])	28.7[illegible]" Hg ([illegible] kPa)
[illegible] ([illegible])	2360	2.4[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	

Maximum Torque [illegible] lb.-ft. ([illegible] Nm) at [illegible] rpm
Maximum Torque Rise [illegible]%
Torque Rise at [illegible] engine rpm [illegible]%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B2) Gear									
100.07 (74.62)	6294 (27.[illegible])	5.9[illegible] (9.4[illegible])	2201	5.2[illegible]	0.468 (0.285)	14.7[illegible] (2.9[illegible])	18[illegible] (8[illegible])	58 (14)	29.18 (98.8[illegible])
75% of Pull at Maximum Power—7th (B2) Gear									
79.2[illegible] (59.0[illegible])	4680 (20.82)	6.3[illegible] (10.22)	2300	2.50	0.518 (0.31[illegible])	13.4[illegible] (2.6[illegible])	18[illegible] (8[illegible])	61 (16)	29.11 (98.58)
50% of Pull at Maximum Power—7th (B2) Gear									
55.5[illegible] (39.9[illegible])	3113 (13.8[illegible])	6.6[illegible] (10.7[illegible])	2325	1.75	0.6[illegible] ([illegible])	11.2[illegible] (2.2[illegible])	17[illegible] (8[illegible])	61 (16)	29.11 (98.58)
75% of Pull at Reduced Engine Speed—9th (B3) Gear									
79.0[illegible] (5[illegible])	4677 (20.8[illegible])	6.34 (10.2[illegible])	1770	2.4[illegible]	0.4[illegible] (0.2[illegible])	14.9[illegible] (2.9[illegible])	18[illegible] (8[illegible])	61 (16)	29.1[illegible] (98.5[illegible])
50% of Pull at Reduced Engine Speed—9th (B3) Gear									
55.7[illegible] (40.[illegible])	3121 (13.8[illegible])	6.6[illegible] (10.7[illegible])	1785	1.6[illegible]	0.5[illegible] ([illegible])	13.0[illegible] (2.5[illegible])	17[illegible] (7[illegible])	61 (16)	29.11 (98.58)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: September, 1989.

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704.

FUEL OIL and TIME: **Fuel** No. 2 Diesel **Cetane No.** 50.1 **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8390 **Fuel weight** 6.986 lbs/gal (0.837 kg/l) **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 3.772 gal (14.28 l) **Drained from motor** 3.321 gal (12.57 l) **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 27.0 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6466T210939* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" (115.8 mm × 120.7 mm) **Compression ratio** 16.0 to 1 **Displacement** 466 cu in (7634 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: **Fuel rate** 44.1-46.2 lb/hr (20.0-21.0 kg/hr) **High idle** 2350-2400 rpm **Turbo boost** nominal 10-13 psi (69-90 kPa) as measured 12.5 psi (86 kPa).

CHASSIS: **Type** standard **Serial No.** *RW4055H001751* **Tread width** rear 62.0" (1574 mm) to 110.2" (2800 mm) front 58.0" (1470 mm) to 82.0" (2080 mm) **Wheel base** 106.7" (2710 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.14 (3.44) second 2.71 (4.37) third 3.53 (5.69) fourth 4.48 (7.22) fifth 4.92 (7.92) sixth 5.83 (9.38) seventh 6.25 (10.06) eighth 7.40 (11.92) ninth 8.12 (13.08) tenth 8.95 (14.40) eleventh 9.63 (15.50) twelfth 10.32 (16.61) thirteenth 11.36 (18.29) fourteenth 12.23 (19.69) fifteenth 14.78 (23.80) sixteenth 18.77 (30.21) reverse 3.42 (5.51), 4.34 (7.00), 7.87 (12.67), 9.32 (15.01), 10.00 (16.09), 11.84 (19.07) **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 12150 lb (5502 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	3.1[illegible] ([illegible])	[illegible]	1[illegible]	[illegible] ([illegible])	12.[illegible] ([illegible])	18[illegible] ([illegible])	[illegible] ([illegible])	29.0[illegible] ([illegible])
4th (A4) Gear									
96.1[illegible] ([illegible])	[illegible] ([illegible])	3.82 ([illegible])	[illegible]	[illegible]	0.472 ([illegible])	14.[illegible] ([illegible])	18[illegible] ([illegible])	60 ([illegible])	29.13 ([illegible])
5th (B1) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	[illegible]	[illegible]	[illegible] ([illegible])	[illegible] ([illegible])	187 ([illegible])	58 ([illegible])	29.1[illegible] ([illegible])
6th (C1) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	4.92 ([illegible])	1953	4.58	[illegible] ([illegible])	[illegible] ([illegible])	18[illegible] ([illegible])	58 ([illegible])	29.16 ([illegible])
7th (B2) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	1950	[illegible]	0.447 ([illegible])	[illegible] ([illegible])	18[illegible] ([illegible])	58 ([illegible])	29.14 ([illegible])
8th (C2) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	6.[illegible] ([illegible])	[illegible]	[illegible]	0.440 ([illegible])	[illegible] ([illegible])	186 ([illegible])	58 ([illegible])	29.1[illegible] ([illegible])
9th (B3) Gear									
[illegible] ([illegible])	[illegible] ([illegible])	[illegible] ([illegible])	1950	2.9[illegible]	[illegible] ([illegible])	[illegible] ([illegible])	187 ([illegible])	[illegible] ([illegible])	29.1[illegible] ([illegible])
10th (D1) Gear									
101.42 (75.63)	4900 (21.80)	7.87 (12.66)	1947	2.66	0.454 (0.276)	[illegible] ([illegible])	188 (86)	59 (15)	[illegible] ([illegible])
11th (C3) Gear									
100.87 ([illegible])	4562 ([illegible])	8.29 ([illegible])	1952	2.41	0.454 ([illegible])	[illegible] ([illegible])	187 ([illegible])	60 ([illegible])	29.14 ([illegible])

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
1st (A1) Gear									
67.38 (50.24)	13347 (59.37)	1.90 (3.06)	2302	14.55	0.597 (0.363)	11.58 (2.28)	184 (84)	68 (20)	28.93 (97.97)
2nd (A2) Gear									
84.96 (63.36)	13550 (60.28)	2.35 (3.78)	2279	14.40	0.550 (0.335)	12.56 (2.47)	186 (86)	66 (19)	28.92 (97.93)
3rd (A3) Gear									
97.75 (72.89)	11791 (52.45)	3.11 (5.00)	2076	6.25	0.479 (0.291)	14.42 (2.84)	188 (87)	71 (22)	28.93 (97.97)
4th (A4) Gear									
100.82 (75.18)	9689 (43.10)	3.90 (6.28)	2015	4.52	0.459 (0.279)	15.07 (2.97)	188 (87)	73 (23)	28.92 (97.93)
5th (B1) Gear									
100.63 (75.04)	9062 (40.31)	4.16 (6.70)	1956	3.95	0.458 (0.279)	15.08 (2.97)	189 (87)	74 (23)	28.92 (97.93)
6th (C1) Gear									
100.68 (75.08)	7605 (33.82)	4.97 (7.99)	1951	3.29	0.456 (0.278)	15.14 (2.98)	189 (87)	76 (24)	28.91 (97.90)
7th (B2) Gear									
102.87 (76.71)	7254 (32.26)	5.33 (8.58)	1953	3.15	0.451 (0.274)	15.33 (3.02)	189 (87)	76 (24)	28.91 (97.90)
8th (C2) Gear									
101.65 (75.80)	5994 (26.66)	6.36 (10.23)	1954	2.64	0.455 (0.277)	15.19 (2.99)	186 (86)	80 (27)	28.91 (97.90)
9th (B3) Gear									
98.67 (73.58)	5289 (23.53)	7.00 (11.26)	1952	2.25	0.468 (0.284)	14.78 (2.91)	183 (84)	80 (27)	28.90 (97.87)
10th (D1) Gear									
97.86 (72.97)	4760 (21.17)	7.71 (12.41)	1949	2.07	0.470 (0.286)	14.70 (2.90)	186 (85)	80 (27)	28.90 (97.87)
11th (C3) Gear									
98.40 (73.38)	4440 (19.75)	8.31 (13.38)	1949	1.99	0.469 (0.285)	14.74 (2.90)	190 (88)	80 (27)	28.90 (97.87)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests the fuel temperature at the injection pump return was maintained at 128°F (54°C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturer's 3 point lift capacity claim of 6550 lb (2971 kg) or 8470 lb (3842 kg) with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1626**, Summary 064, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Air dry bulb	Barom. inch Hg (kPa)
2nd (A2) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3rd (A3) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4th (A4) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5th (B1) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6th (C1) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7th (B2) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8th (C2) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9th (B3) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10th ([illegible]) Gear									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—5th (B1) Gear	[illegible]
Maximum sound level	[illegible]
Transport speed—no load—16th (D4) Gear	[illegible]
Bystander in 16th (D4) Gear	[illegible]

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2197	1982	1759	1541	1317	1099
Pull—lbs	6161	6906	7457	7901	8133	8114
(kN)	(27.41)	(30.72)	(33.17)	(35.14)	(36.18)	(36.09)
Increase in Pull %	0	12	21	28	32	32
Power—Hp	99.09	99.80	95.49	88.32	77.59	64.61
(kW)	(73.89)	(74.42)	(71.21)	(65.86)	(57.86)	(48.18)
Speed—Mph	6.03	5.42	4.80	4.20	3.58	2.99
(km/h)	(9.71)	(8.72)	(7.73)	(6.75)	(5.76)	(4.81)
Slip %	2.64	3.15	3.33	3.45	3.77	3.61

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2540 (175)
Location	remote outlet
Hydraulic oil temperature °F (°C)	139 (59)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb	7550	7482	7199	6526	6175
(kN)	(33.6)	(33.3)	(32.0)	(29.0)	(27.5)

with lift assist cylinder

Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb	9855	9872	9540	8633	8077
(kN)	(43.8)	(43.9)	(42.4)	(38.4)	(35.9)

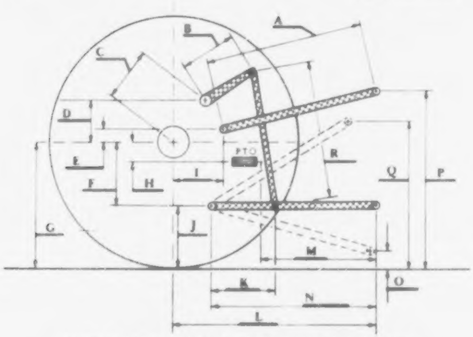
TIRES AND WEIGHT		With Ballast	Without Ballast
Rear Tires	No., size, ply & psi (kPa)	Two 18.4R38; [illegible]	Two 18.4R38; [illegible]
Ballast	Liquid (total)	None	None
	Cast iron (total)	[illegible]	None
Front Tires	No., size, ply & psi (kPa)	[illegible]	[illegible]
Ballast	Liquid (total)	None	None
	Cast iron (total)	[illegible]	None
Height of Drawbar		[illegible]	[illegible]
Static Weight	Rear	[illegible]	[illegible]
	Front	[illegible]	[illegible]
	Total	[illegible]	[illegible]

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum Force Exerted Through Whole Range	[illegible] lbs (24.7 kN) *7281 lbs (32.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2540 psi (175 bar)
ii) Pump delivery rate at minimum pressure	27.6 GPM (104.5 l/min)
iii) Pump delivery rate at maximum hydraulic power	26.1 GPM (98.8 l/min)
Delivery pressure	2100 psi (145 bar)
Power	32.0 Hp (23.9 kW)
	*with lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	26.6	676
B	11.5	292
C	11.3	287
D	10.9	278
E	5.5	140
F	10.2	259
G	33.1	842
H	6.5	165
I	13.5	343
J	22.9	581
K	23.1	587
L	41.2	1046
M	21.6	549
N	36.7	932
O	8.3	211
P	43.0	1093
Q	35.5	903
R	32.8	833

John Deere 4055 Quadrange Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1627—SUMMARY 065
JOHN DEERE 4255 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
125.69 (92.21)	2200	7.51 (28.44)	0.420 (0.255)	16.40 (3.24)	
Maximum Power (2 Hours)					
127.91 (95.38)	2000	7.29 (27.58)	0.391 (0.238)	17.55 (3.46)	
VARYING POWER AND FUEL CONSUMPTION					Air temperature
125.69 (92.21)	2200	7.51 (28.44)	0.420 (0.255)	16.40 (3.24)	74°F (23°C)
109.79 (81.87)	2256	7.08 (26.79)	0.447 (0.272)	15.51 (3.06)	Relative humidity
85.35 (63.65)	2322	5.90 (22.35)	0.490 (0.298)	14.47 (2.85)	50%
55.92 (41.70)	2343	4.73 (17.91)	0.585 (0.356)	11.82 (2.33)	Barometer
28.17 (21.01)	2361	3.65 (13.80)	0.895 (0.544)	7.72 (1.52)	29.16" Hg (98.74 kPa)
1.03 (0.77)	2379	2.56 (9.70)	17.152 (10.433)	0.40 (0.08)	

Maximum Torque 395 lb-ft (535 Nm) at 1252 rpm
Maximum Torque Rise 34%
Torque Rise at 1900 engine rpm 27%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
Maximum Power—8th (C2) Gear									
112.26 (83.71)	5925 (26.36)	7.11 (11.43)	2201	3.15	0.460 (0.280)	15.01 (2.96)	185 (85)	64 (18)	29.07 (98.44)
75% of Pull at Maximum Power—8th (C2) Gear									
89.67 (66.87)	4479 (19.92)	7.51 (12.08)	2308	2.48	0.505 (0.306)	13.75 (2.71)	183 (84)	66 (19)	29.00 (98.21)
50% of Pull at Maximum Power—8th (C2) Gear									
60.50 (45.12)	2967 (13.20)	7.65 (12.31)	2332	1.66	0.596 (0.362)	11.60 (2.28)	180 (82)	66 (19)	29.00 (98.21)
75% of Pull at Reduced Engine Speed—11th (C3) Gear									
89.63 (66.83)	4479 (19.92)	7.50 (12.08)	1772	2.40	0.452 (0.275)	15.28 (3.01)	182 (83)	67 (19)	29.00 (98.21)
50% of Pull at Reduced Engine Speed—11th (C3) Gear									
60.45 (45.07)	2967 (13.20)	7.64 (12.30)	1791	1.66	0.507 (0.309)	13.62 (2.68)	177 (80)	68 (20)	29.00 (98.21)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: September, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.066 gal *(15.392 l)* **Drained from motor** 3.880 gal *(14.686 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Total time engine was operated** 23.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T109300* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 49.6-54.1 lb/hr *(22.5-24.5 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 12-15 psi *(83-103 kPa)* as measured 14.8 psi *(102 kPa)*

CHASSIS: Type standard **Serial No.** ***RW4255H001914*** **Tread width** rear 62.0" *(1574 mm)* to 110.2" *(2800 mm)* front 58.0" *(1470 mm)* to 82.0" *(2080 mm)* **Wheel base** 106.7" *(2710 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.14 *(3.44)* second 2.71 *(4.37)* third 3.53 *(5.69)* fourth 4.48 *(7.22)* fifth 4.92 *(7.92)* sixth 5.83 *(9.38)* seventh 6.25 *(10.06)* eighth 7.40 *(11.92)* ninth 8.12 *(13.08)* tenth 8.95 *(14.40)* eleventh 9.63 *(15.50)* twelfth 10.32 *(16.61)* thirteenth 11.36 *(18.29)* fourteenth 12.23 *(19.69)* fifteenth 14.78 *(23.80)* sixteenth 18.77 *(30.23)* reverse 3.42 *(5.51)*, 4.34 *(7.00)*, 7.87 *(12.67)*, 9.32 *(15.01)*, 10.00 *(16.09)*, 11.84 *(19.07)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 12225 lb *(5545 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
3rd (A3) Gear									
95.79 (71.43)	10697 (47.58)	3.36 (5.40)	2297	8.24	0.509 (0.310)	13.57 (2.67)	182 (83)	51 (11)	29.04 (98.34)
4th (A4) Gear									
110.24 (82.21)	10175 (45.26)	4.06 (6.54)	2166	7.29	0.470 (0.286)	14.70 (2.90)	183 (84)	54 (12)	29.04 (98.34)
5th (B1) Gear									
111.90 (83.45)	9737 (43.31)	4.31 (6.94)	2076	6.32	0.458 (0.279)	15.08 (2.97)	184 (84)	58 (14)	29.04 (98.34)
6th (C1) Gear									
112.53 (83.91)	8964 (39.87)	4.71 (7.58)	1902	5.56	0.445 (0.271)	15.53 (3.06)	186 (85)	64 (18)	29.03 (98.31)
7th (B2) Gear									
114.64 (85.49)	8482 (37.73)	5.07 (8.16)	1898	5.10	0.440 (0.268)	15.70 (3.09)	185 (85)	64 (18)	29.08 (98.48)
8th (C2) Gear									
115.39 (86.05)	7124 (31.69)	6.08 (9.79)	1901	4.01	0.436 (0.265)	15.86 (3.12)	186 (85)	64 (18)	29.06 (98.41)
9th (B3) Gear									
114.23 (85.18)	6368 (28.32)	6.73 (10.83)	1904	3.37	0.438 (0.266)	15.78 (3.11)	186 (86)	64 (18)	29.05 (98.37)
10th (D1) Gear									
114.26 (85.21)	5769 (25.66)	7.43 (11.95)	1901	3.13	0.439 (0.267)	15.74 (3.10)	186 (86)	64 (18)	29.04 (98.34)
11th (C3) Gear									
113.61 (84.72)	5322 (23.67)	8.01 (12.88)	1899	2.81	0.440 (0.268)	15.71 (3.10)	186 (86)	64 (18)	29.04 (98.34)

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
2nd (A2) Gear									
95.89 (71.50)	14627 (65.06)	2.41 (3.87)	2293	14.04	0.535 (0.325)	12.92 (2.54)	181 (83)	55 (13)	29.14 (98.68)
3rd (A3) Gear									
109.72 (81.82)	12994 (57.80)	3.17 (5.10)	2125	6.57	0.472 (0.287)	14.64 (2.88)	186 (85)	64 (18)	29.12 (98.61)
4th (A4) Gear									
112.87 (84.17)	10837 (48.21)	3.91 (6.29)	2025	4.29	0.452 (0.275)	15.27 (3.01)	186 (85)	72 (22)	29.11 (98.58)
5th (B1) Gear									
112.06 (83.56)	10402 (46.27)	4.04 (6.50)	1901	4.14	0.449 (0.273)	15.40 (3.03)	186 (85)	72 (22)	29.10 (98.54)
6th (C1) Gear									
111.66 (83.26)	8678 (38.60)	4.83 (7.77)	1901	3.26	0.448 (0.272)	15.43 (3.04)	185 (85)	72 (22)	29.08 (98.48)
7th (B2) Gear									
115.42 (86.07)	8378 (37.27)	5.17 (8.31)	1897	3.18	0.434 (0.264)	15.91 (3.13)	187 (86)	74 (23)	29.07 (98.44)
8th (C2) Gear									
115.69 (86.27)	7028 (31.26)	6.17 (9.93)	1902	2.61	0.435 (0.264)	15.90 (3.13)	188 (86)	76 (24)	29.06 (98.41)
9th (B3) Gear									
113.45 (84.60)	6268 (27.88)	6.79 (10.92)	1901	2.45	0.443 (0.270)	15.59 (3.07)	188 (86)	76 (24)	29.06 (98.41)
10th (D1) Gear									
112.56 (83.94)	5634 (25.06)	7.49 (12.06)	1901	2.29	0.447 (0.272)	15.47 (3.05)	187 (86)	76 (24)	29.06 (98.41)
11th (C3) Gear									
112.07 (83.57)	5201 (23.14)	8.08 (13.00)	1900	2.04	0.447 (0.272)	15.47 (3.05)	188 (86)	77 (25)	29.06 (98.41)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 123° F *(50° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb *(2971 kg)* or 8470 lb *(3842 kg)* with lift assist cylinder. The pull in 3rd (A3) gear (unballasted tractor) was limited by tire tangential pull. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1627**, Summary 065, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
2nd (A2) Gear									
93.99 (70.09)	14685 (65.32)	2.41 (3.88)	2293	14.04	0.534 (0.325)	12.93 (2.55)	182 (83)	55 (13)	29.13 (98.65)
3rd (A3) Gear									
108.17 (80.66)	12231 (54.41)	3.32 (5.34)	2200	3.38	0.479 (0.291)	14.42 (2.84)	184 (84)	62 (17)	29.12 (98.61)
4th (A4) Gear									
109.92 (81.97)	9632 (42.84)	4.28 (6.89)	2200	3.66	0.469 (0.285)	14.74 (2.90)	185 (85)	68 (20)	29.11 (98.58)
5th (B1) Gear									
109.83 (81.90)	8758 (38.96)	4.71 (7.58)	2200	3.34	0.473 (0.288)	14.62 (2.88)	185 (85)	72 (22)	29.10 (98.54)
6th (C1) Gear									
109.76 (81.85)	7326 (32.59)	5.62 (9.04)	2201	2.78	0.474 (0.288)	14.59 (2.87)	186 (85)	72 (22)	29.09 (98.51)
7th (B2) Gear									
111.90 (83.44)	6973 (31.02)	6.02 (9.69)	2197	2.61	0.465 (0.283)	14.86 (2.93)	185 (85)	76 (24)	29.07 (98.44)
8th (C2) Gear									
110.56 (82.44)	5776 (25.69)	7.18 (11.55)	2202	2.20	0.470 (0.286)	14.70 (2.90)	185 (85)	76 (24)	29.06 (98.41)
9th (B3) Gear									
109.55 (81.69)	5199 (23.13)	7.90 (12.72)	2203	2.04	0.474 (0.288)	14.57 (2.87)	185 (85)	76 (24)	29.06 (98.41)
10th (D1) Gear									
108.18 (80.67)	4657 (20.72)	8.71 (14.02)	2201	1.96	0.480 (0.292)	14.41 (2.84)	186 (86)	76 (24)	29.06 (98.41)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—5th (B1) Gear	76.5
Maximum sound level	76.5
Transport speed—no load—16th (D4) Gear	75.5
Bystander in 16th (D4) Gear	85.0

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2197	1985	1755	1539	1322	1101
Pull—lbs (kN)	6973 (31.02)	7907 (35.17)	8771 (39.02)	9086 (40.42)	9268 (41.23)	9148 (40.69)
Increase in Pull %	0	13	26	30	33	31
Power—Hp (kW)	111.90 (83.44)	114.26 (85.21)	111.65 (83.26)	101.23 (75.49)	88.60 (66.07)	72.84 (54.32)
Speed—Mph (km/h)	6.02 (9.69)	5.42 (8.72)	4.77 (7.68)	4.18 (6.72)	3.59 (5.77)	2.99 (4.81)
Slip %	2.61	3.10	3.26	3.58	3.58	3.58

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2570 (177)
Location	remote outlet
Hydraulic oil temperature °F(°C)	140 (60)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb " " " " " " (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6526 (29.0)	6175 (27.5)
with lift assist cylinder					
Hitch point distance to ground level in (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb " " " " " " (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8633 (38.4)	8077 (35.9)

TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi (kPa)	Four 18.4R38; *; 12 (85)	Two 18.4R38; *; 16 (110)
Ballast—Duals (total)	1410 lb (640 kg)	None
—Cast Iron (total)	1000 lb (454 kg)	None
Front Tires—No., size, ply & psi (kPa)	Two 11.00-16; 8; 40 (275)	Two 11.00-16; 8; 40 (275)
Ballast—Liquid (total)	None	None
—Test Equip (total)	170 lb (77 kg)	None
Height of Drawbar	21.5 in (545 mm)	22 in (560 mm)
Static Weight—Rear	11017 lb (4998 kg)	8430 lb (3824 kg)
—Front	3790 lb (1719 kg)	3795 lb (1721 kg)
—Total	14807 lb (6717 kg)	12225 lb (5545 kg)

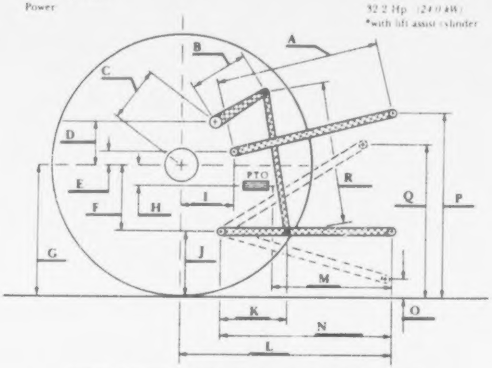
THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY II

Quick Attach None

Maximum Force Exerted Through Whole Range	5504 lbs (24.5 kN) *7281 lbs (32.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2570 psi (177 Bar)
ii) Pump delivery rate at minimum pressure	27.4 GPM (103.7 l/min)
iii) Pump delivery rate at maximum hydraulic power	26.3 GPM (99.6 l/min)
Delivery pressure	2100 psi (145 Bar)
Power	32.2 Hp (24.0 kW)

*with lift assist cylinder



	inch	mm
A	26.6	676
B	11.5	292
C	11.3	287
D	10.9	278
E	5.6	143
F	10.1	256
G	33.1	842
H	6.5	165
I	14.3	362
J	22.9	583
K	23.1	587
L	41.6	1056
M	22.0	558
N	37.1	942
O	8.3	211
P	43.0	1093
Q	35.5	903
R	32.8	833

HITCH DIMENSIONS AS TESTED—NO LOAD

John Deere 4255 Quadrange Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1628—SUMMARY 066
JOHN DEERE 4455 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
142.69 *(106.40)*	2200	8.37 *(31.67)*	0.405 *(0.246)*	17.05 *(3.36)*	
Maximum Power (2 Hours)					
148.14 *(110.47)*	1900	8.16 *(30.91)*	0.381 *(0.232)*	18.14 *(3.57)*	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
142.69 *(106.40)*	2200	8.37 *(31.67)*	0.405 *(0.246)*	17.05 *(3.36)*	74°F *(23°C)*
125.87 *(93.86)*	2281	7.77 *(29.42)*	0.427 *(0.260)*	16.20 *(3.19)*	Relative humidity
95.37 *(71.12)*	2309	6.38 *(24.16)*	0.462 *(0.281)*	14.94 *(2.94)*	36%
64.20 *(47.87)*	2331	5.04 *(19.08)*	0.542 *(0.330)*	12.75 *(2.51)*	Barometer
32.40 *(24.16)*	2353	3.78 *(14.30)*	0.806 *(0.490)*	8.58 *(1.69)*	29.08" Hg *(98.46 kPa)*
1.03 *(0.77)*	2374	2.43 *(9.20)*	16.310 *(9.921)*	0.42 *(0.08)*	

Maximum Torque 469 lb.-ft *(636 Nm)* at 1350 rpm
Maximum Torque Rise 37.5%
Torque Rise at 1000 engine rpm 30.7%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
Maximum Power—9th (B3) Gear									
128.59 *(95.89)*	6115 *(27.20)*	7.89 *(12.69)*	2201	2.81	0.447 *(0.272)*	15.46 *(3.05)*	187 *(86)*	71 *(22)*	28.87 *(97.77)*
75% of Pull at Maximum Power—9th (B3) Gear									
101.56 *(75.73)*	4589 *(20.41)*	8.30 *(13.36)*	2302	2.20	0.489 *(0.298)*	14.12 *(2.78)*	186 *(86)*	77 *(25)*	28.87 *(97.77)*
50% of Pull at Maximum Power—9th (B3) Gear									
69.08 *(51.51)*	3063 *(13.62)*	8.46 *(13.61)*	2331	1.51	0.566 *(0.344)*	12.21 *(2.41)*	183 *(84)*	77 *(25)*	28.87 *(97.77)*
75% of Pull at Reduced Engine Speed—12th (B4) Gear									
101.29 *(75.53)*	4583 *(20.39)*	8.29 *(13.34)*	1822	2.20	0.449 *(0.273)*	15.38 *(3.03)*	187 *(86)*	78 *(26)*	28.87 *(97.77)*
50% of Pull at Reduced Engine Speed—12th (B4) Gear									
68.85 *(51.33)*	3053 *(13.58)*	8.46 *(13.61)*	1848	1.51	0.499 *(0.303)*	13.85 *(2.73)*	181 *(83)*	78 *(26)*	28.87 *(97.77)*

Location of Test: Center for Agricultural Equipment, Lincoln Nebraska 68583-0832, U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.181 gal *(15.827 l)* **Drained from motor** 3.927 gal *(14.865 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Total time engine was operated** 23.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T109286* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 56.3-61.5 lb/hr *(25.6-27.9 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 14-17 psi *(97-117 kPa)* as measured 17.0 psi *(117 kPa)*

CHASSIS: Type standard **Serial No.** *RW4455H002608* **Tread width** rear 62.0" *(1574 mm)* to 116.0" *(2950 mm)* front 58.0" *(1470 mm)* to 82.0" *(2080 mm)* **Wheel base** 106.7" *(2710 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph** *(km/h)* first 2.16 *(3.47)* second 2.73 *(4.39)* third 3.56 *(5.74)* fourth 4.50 *(7.25)* fifth 4.96 *(7.99)* sixth 5.88 *(9.47)* seventh 6.27 *(10.10)* eighth 7.43 *(11.97)* ninth 8.20 *(13.20)* tenth 9.03 *(14.53)* eleventh 9.71 *(15.64)* twelfth 10.36 *(16.68)* thirteenth 11.41 *(18.37)* fourteenth 12.28 *(19.77)* fifteenth 14.91 *(24.01)* sixteenth 18.84 *(30.34)* reverse 3.45 *(5.56)*, 4.36 *(7.03)*, 7.94 *(12.78)*, 9.41 *(15.15)*, 10.03 *(16.15)*, 11.89 *(19.15)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm **Unladen tractor mass** 13315 lb *(6040 kg)*.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
3rd (A3) Gear									
108.51 *(80.91)*	12195 *(54.24)*	3.34 *(5.37)*	2286	8.85	0.491 *(0.299)*	14.07 *(2.77)*	185 *(85)*	65 *(18)*	28.88 *(97.80)*
4th (A4) Gear									
124.19 *(92.61)*	11298 *(50.26)*	4.12 *(6.63)*	2182	6.60	0.465 *(0.283)*	14.87 *(2.93)*	186 *(86)*	65 *(18)*	28.90 *(97.87)*
5th (B1) Gear									
127.85 *(95.34)*	10958 *(48.74)*	4.38 *(7.04)*	2100	6.52	0.449 *(0.273)*	15.39 *(3.03)*	187 *(86)*	73 *(23)*	28.89 *(97.83)*
6th (C1) Gear									
132.40 *(98.73)*	10441 *(46.44)*	4.76 *(7.65)*	1905	5.48	0.430 *(0.262)*	16.07 *(3.17)*	189 *(87)*	72 *(22)*	28.88 *(97.80)*
7th (B2) Gear									
131.38 *(97.97)*	9634 *(42.85)*	5.11 *(8.23)*	1904	4.66	0.433 *(0.264)*	15.94 *(3.14)*	189 *(87)*	69 *(21)*	28.86 *(97.73)*
8th (C2) Gear									
130.97 *(97.66)*	8058 *(35.84)*	6.10 *(9.81)*	1903	4.00	0.433 *(0.264)*	15.95 *(3.14)*	190 *(88)*	73 *(23)*	28.88 *(97.80)*
9th (B3) Gear									
134.18 *(100.06)*	7430 *(33.05)*	6.77 *(10.90)*	1903	3.41	0.425 *(0.258)*	16.27 *(3.20)*	189 *(87)*	70 *(21)*	28.87 *(97.77)*
10th (D1) Gear									
132.85 *(99.07)*	6684 *(29.73)*	7.45 *(12.00)*	1900	3.24	0.426 *(0.259)*	16.22 *(3.20)*	189 *(87)*	74 *(23)*	28.88 *(97.80)*
11th (C3) Gear									
133.14 *(99.28)*	6229 *(27.71)*	8.02 *(12.90)*	1893	2.98	0.425 *(0.259)*	16.26 *(3.20)*	190 *(88)*	75 *(24)*	28.88 *(97.80)*

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
2nd (A2) Gear									
114.68 *(85.51)*	17159 *(76.33)*	2.51 *(4.03)*	2263	9.74	0.492 *(0.299)*	14.05 *(2.77)*	184 *(84)*	56 *(13)*	29.27 *(99.12)*
3rd (A3) Gear									
130.06 *(96.99)*	15839 *(70.46)*	3.08 *(4.96)*	2049	6.36	0.445 *(0.271)*	15.52 *(3.06)*	186 *(86)*	62 *(17)*	29.28 *(99.15)*
4th (A4) Gear									
131.29 *(97.90)*	13021 *(57.92)*	3.78 *(6.09)*	1951	4.41	0.438 *(0.266)*	15.78 *(3.11)*	188 *(86)*	62 *(17)*	29.27 *(99.12)*
5th (B1) Gear									
134.35 *(100.18)*	12394 *(55.13)*	4.07 *(6.54)*	1901	4.08	0.424 *(0.258)*	16.28 *(3.21)*	188 *(86)*	66 *(19)*	29.26 *(99.09)*
6th (C1) Gear									
135.77 *(101.24)*	10473 *(46.58)*	4.86 *(7.82)*	1905	3.40	0.420 *(0.255)*	16.47 *(3.24)*	189 *(87)*	67 *(19)*	29.26 *(99.09)*
7th (B2) Gear									
132.03 *(98.45)*	9542 *(42.44)*	5.19 *(8.35)*	1899	3.06	0.431 *(0.262)*	16.04 *(3.16)*	189 *(87)*	69 *(21)*	29.24 *(99.02)*
8th (C2) Gear									
132.74 *(98.98)*	8037 *(35.75)*	6.19 *(9.97)*	1902	2.46	0.429 *(0.261)*	16.08 *(3.17)*	189 *(87)*	69 *(21)*	29.23 *(98.98)*
9th (B3) Gear									
134.59 *(100.36)*	7380 *(32.83)*	6.84 *(11.01)*	1899	2.29	0.422 *(0.257)*	16.36 *(3.22)*	189 *(87)*	69 *(21)*	29.22 *(98.95)*
10th (D1) Gear									
134.86 *(100.57)*	6695 *(29.78)*	7.55 *(12.16)*	1902	2.12	0.423 *(0.257)*	16.34 *(3.22)*	189 *(87)*	70 *(21)*	29.21 *(98.92)*
11th (C3) Gear									
134.46 *(100.27)*	6202 *(27.59)*	8.13 *(13.08)*	1898	1.94	0.424 *(0.258)*	16.31 *(3.21)*	190 *(88)*	70 *(21)*	29.20 *(98.88)*

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 128° F *(53° C)*. This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 6550 lb *(2971 kg)* or 8470 lb *(3842 kg)* with lift assist cylinder. The pull in 3rd (A3) gear (unballasted tractor) was limited by tire tangential pull. The pull in 2nd (A2) gear (ballasted tractor) was limited by tractor stability. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1628**, Summary 066, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
				2nd (A2) Gear					
116.10 (86.57)	17161 (76.34)	2.54 (4.08)	2265	8.61	0.486 (0.296)	14.21 (2.80)	185 (85)	54 (12)	29.27 (99.12)
				3rd (A3) Gear					
127.33 (94.95)	14235 (63.32)	3.35 (5.40)	2200	4.99	0.454 (0.276)	15.21 (3.00)	185 (85)	60 (16)	29.28 (99.15)
				4th (A4) Gear					
126.20 (94.11)	11008 (48.97)	4.30 (6.92)	2200	3.66	0.457 (0.278)	15.13 (2.98)	186 (86)	62 (17)	29.28 (99.15)
				5th (B1) Gear					
128.78 (96.03)	10157 (45.18)	4.75 (7.65)	2204	3.32	0.448 (0.272)	15.44 (3.04)	186 (85)	64 (18)	29.27 (99.12)
				6th (C1) Gear					
128.84 (96.07)	8547 (38.02)	5.65 (9.10)	2197	2.72	0.446 (0.271)	15.49 (3.05)	187 (86)	67 (19)	29.25 (99.05)
				7th (B2) Gear					
126.74 (94.51)	7853 (34.93)	6.05 (9.74)	2201	2.38	0.450 (0.274)	15.35 (3.02)	188 (86)	67 (19)	29.24 (99.02)
				8th (C2) Gear					
125.90 (93.88)	6559 (29.18)	7.20 (11.58)	2198	2.03	0.456 (0.277)	15.17 (2.99)	188 (87)	69 (21)	29.23 (98.98)
				9th (B3) Gear					
128.32 (95.68)	6060 (26.95)	7.94 (12.78)	2196	1.94	0.450 (0.273)	15.37 (3.03)	188 (87)	69 (21)	29.22 (98.95)
				10th (D1) Gear					
127.62 (95.17)	5459 (24.28)	8.77 (14.11)	2198	1.68	0.451 (0.274)	15.33 (3.02)	189 (87)	69 (21)	29.21 (98.92)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—5th (B1) Gear	76.0
Maximum sound level	76.0
Transport speed—no load—16th (D4) Gear	76.0
Bystander in 16th (D4) Gear	85.0

LUGGING ABILITY IN 6th (C1) GEAR

Crankshaft Speed rpm	2197	1984	1765	1540	1323	1106
Pull—lbs (kN)	8547 (38.02)	9938 (44.21)	10969 (48.79)	11586 (51.54)	11924 (53.04)	11832 (52.63)
Increase in Pull %	0	16	28	36	40	38
Power—Hp (kW)	128.84 (96.07)	134.53 (100.32)	131.74 (98.24)	121.00 (90.23)	106.67 (79.54)	88.54 (66.02)
Speed—Mph (km/h)	5.65 (9.10)	5.08 (8.17)	4.50 (7.25)	3.92 (6.30)	3.35 (5.40)	2.81 (4.52)
Slip %	2.72	3.06	3.57	3.74	3.91	3.91

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2560 (176)
Location	remote outlet
Hydraulic oil temperature °F(°C)	143 (62)
Location	transmission sump
Category	II
Quick attach	No

Hitch point distance to ground level in. (mm)	8.7 (221)	15.7 (399)	22.4 (569)	30.4 (772)	37.4 (950)
Lift force on frame lb. (kN)	7550 (33.6)	7482 (33.3)	7199 (32.0)	6526 (29.0)	6175 (27.5)
			with lift assist cylinder		
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	22.3 (566)	30.4 (772)	37.4 (950)
Lift force on frame lb. (kN)	9833 (43.7)	9872 (43.9)	9540 (42.4)	8633 (38.4)	8077 (35.9)

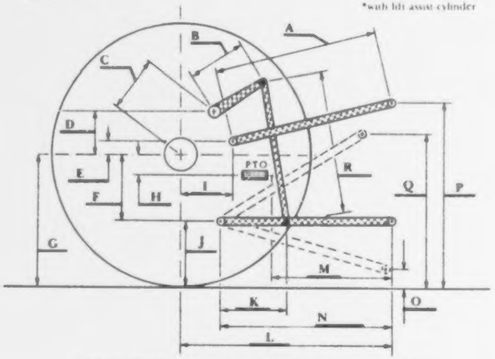
TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi (kPa)	Four 18.4R42, **, 14 (95)	Two 18.4R42, **, 18 (125)
Ballast—Duals (total)	1710 lb (776 kg)	None
—Cast Iron (total)	2000 lb (907 kg)	None
Front Tires—No., size, ply & psi (kPa)	Two 11.00-16, 8, 40 (275)	Two 11.00-16, 8, 40 (275)
Ballast—Liquid (total)	None	None
—Test Equip (total)	185 lb (84 kg)	None
Height of Drawbar	19 in (483 mm)	25 in (635 mm)
Static Weight—Rear	13390 lb (6073 kg)	9475 lb (4298 kg)
—Front	3820 lb (1733 kg)	3840 lb (1742 kg)
—Total	17210 lb (7806 kg)	13315 lb (6040 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: II
Quick Attach: None

Maximum Force Exerted Through Whole Range	5504 lbs (24.5 kN) *7281 lbs (32.4 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2560 psi (176 Bar)
ii) Pump delivery rate at minimum pressure	27.1 GPM (102.6 l/min)
iii) Pump delivery rate at maximum hydraulic power	26.1 GPM (98.8 l/min)
Delivery pressure	2100 psi (145 Bar)
Power	32.0 Hp (23.8 kW)

*with lift assist cylinder



	inch	mm
A	26.6	676
B	11.5	292
C	11.3	287
D	10.9	278
E	5.6	143
F	10.2	259
G	35.1	892
H	6.5	165
I	14.3	362
J	24.9	633
K	23.1	587
L	41.6	1056
M	22.0	558
N	37.1	942
O	10.3	262
P	45.0	1143
Q	37.5	953
R	32.8	833

HITCH DIMENSIONS AS TESTED—NO LOAD

John Deere 4455 Quadrange Diesel

**Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director**

NEBRASKA OECD TRACTOR TEST 1629—SUMMARY 067
JOHN DEERE 4555 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—990 rpm)					
156.83 (116.95)	2200	9.01 (34.11)	0.397 (0.241)	17.41 (3.43)	
Maximum Power (2 Hours)					
162.53 (121.20)	1990	8.90 (33.68)	0.378 (0.230)	18.27 (3.60)	
VARYING POWER AND FUEL CONSUMPTION					
156.83 (116.95)	2200	9.01 (34.11)	0.397 (0.241)	17.41 (3.43)	Air temperature 75°F (24°C)
137.26 (102.36)	2264	8.29 (31.38)	0.417 (0.254)	16.56 (3.26)	Relative humidity
104.31 (77.79)	2299	6.73 (25.47)	0.445 (0.271)	15.51 (3.06)	50%
70.27 (52.40)	2331	5.30 (20.06)	0.522 (0.317)	13.26 (2.61)	Barometer
35.65 (26.58)	2358	3.90 (14.78)	0.757 (0.460)	9.12 (1.80)	28.88" Hg (97.80 kPa)
1.29 (0.96)	2388	2.32 (8.77)	13.505 (8.214)	0.55 (0.11)	

Maximum Torque 505 lb.-ft. (684 Nm) at 1451 rpm

Maximum Torque Rise 35%

Torque Rise at 1760 engine rpm 24%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th (C2) Gear									
139.99 (104.39)	7885 (35.07)	6.66 (10.72)	2200	4.36	0.444 (0.270)	15.55 (3.06)	183 (84)	70 (21)	28.90 (97.87)
75% of Pull at Maximum Power—8th (C2) Gear									
110.08 (82.09)	5914 (26.31)	6.98 (11.23)	2275	3.01	0.475 (0.289)	14.53 (2.86)	182 (83)	75 (24)	28.89 (97.83)
50% of Pull at Maximum Power—8th (C2) Gear									
75.39 (56.22)	3947 (17.55)	7.16 (11.53)	2311	2.15	0.542 (0.330)	12.75 (2.51)	180 (82)	75 (24)	28.89 (97.83)
75% of Pull at Reduced Engine Speed—10th (D1) Gear									
110.17 (82.15)	5918 (26.32)	6.98 (11.24)	1702	3.01	0.442 (0.269)	15.65 (3.08)	184 (84)	75 (24)	28.89 (97.83)
50% of Pull at Reduced Engine Speed—10th (D1) Gear									
75.17 (56.05)	3936 (17.51)	7.16 (11.53)	1811	2.15	0.485 (0.295)	14.31 (2.82)	179 (82)	75 (24)	28.89 (97.83)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: September-October, 1989.

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704.

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8500 **Fuel weight** 7.079 lbs/gal (0.848 kg/l) **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.823 gal (18.257 l) **Drained from motor** 4.598 gal (17.406 l) **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 25.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T100007* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" (115.8 mm × 120.7 mm) **Compression ratio** 16.0 to 1 **Displacement** 466 cu in (7634 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 59.9-65.4 lb/hr (27.2-29.7 kg/hr) **High idle** 2350-2400 rpm **Turbo boost** nominal 15-18 psi (103-124 kPa) as measured 17.0 psi (117 kPa).

CHASSIS: Type standard **Serial No.** *RW4555H001855* **Tread width** rear 62.0" (1574 mm) to 115.7" (2938 mm) front 61.0" (1550 mm) to 85.0" (2160 mm) **Wheel base** 118.5" (3010 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.11 (3.39) second 2.67 (4.30) third 3.80 (6.12) fourth 4.71 (7.58) fifth 4.83 (7.78) sixth 5.53 (8.90) seventh 5.97 (9.62) eighth 7.02 (11.30) ninth 8.50 (13.69) tenth 8.95 (14.42) eleventh 9.99 (16.08) twelfth 10.80 (17.39) thirteenth 11.37 (18.31) fourteenth 12.68 (20.42) fifteenth 16.19 (26.07) sixteenth 20.56 (33.10) reverse 3.97 (6.39), 5.04 (8.11), 8.87 (14.28), 10.42 (16.78), 11.26 (18.14), 13.23 (21.31) **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 998 rpm at 2200 engine rpm **Unladen tractor mass** 15840 lb (7185 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
115.40 (86.05)	13035 (57.98)	3.32 (5.34)	2264	14.55	[illegible]	13.38 (2.64)	182 (83)	75 (24)	28.92 (97.93)
4th (B1) Gear									
136.10 (101.49)	11719 (52.13)	4.36 (7.01)	2198	10.64	0.458 (0.279)	15.06 (2.97)	183 (84)	64 (18)	28.90 (97.87)
5th (A4) Gear									
137.16 (102.28)	11954 (53.17)	4.30 (6.92)	2131	7.96	0.452 (0.275)	15.28 (3.01)	181 (83)	66 (19)	28.90 (97.87)
6th (C1) Gear									
138.57 (103.33)	11077 (49.27)	4.69 (7.55)	2020	6.74	0.447	15.46 (3.05)	187 (86)	67 (19)	28.90 (97.87)
7th (B2) Gear									
142.01 (105.90)	10866 (48.33)	4.90 (7.89)	1950	6.71	0.433 (0.264)	15.93 (3.14)	188 (86)	69 (21)	28.90 (97.87)
8th (C2) Gear									
143.04 (106.67)	9161 (40.75)	5.86 (9.42)	1932	5.27	0.430 (0.262)	16.07 (3.17)	187 (86)	69 (21)	28.90 (97.87)
9th (B3) Gear									
141.02 (105.16)	7375 (32.81)	7.17 (11.54)	1948	3.94	0.433 (0.263)	15.88 (3.13)	187 (86)	70 (21)	28.90 (97.87)
10th (D1) Gear									
141.15 (105.26)	6985 (31.07)	7.58 (12.19)	1949	3.77	0.437 (0.266)	15.83 (3.12)	187 (86)	72 (22)	28.90 (97.87)
11th (C3) Gear									
141.17 (105.27)	6235 (27.74)	8.49 (13.66)	1949	3.27	0.433 (0.263)	15.88 (3.13)	187 (86)	72 (22)	28.90 (97.87)

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
1st (A1) Gear									
89.02 (66.38)	17784 (79.10)	1.88 (3.02)	2293	15.70	0.541 (0.329)	12.77 (2.52)	180 (82)	56 (13)	29.08 (98.48)
2nd (A2) Gear									
110.66 (82.52)	17681 (78.65)	2.35 (3.78)	2269	14.17	0.510 (0.310)	13.56 (2.67)	181 (83)	53 (12)	29.08 (98.48)
3rd (A3) Gear									
140.21 (104.56)	15808 (70.32)	3.33 (5.35)	2077	6.59	0.445 (0.270)	15.54 (3.06)	185 (85)	60 (16)	29.08 (98.48)
4th (B1) Gear									
142.79 (106.48)	13441 (59.79)	3.98 (6.41)	1979	5.14	0.433 (0.263)	15.95 (3.14)	187 (86)	64 (18)	29.08 (98.48)
5th (A4) Gear									
144.37 (107.66)	13440 (59.78)	4.03 (6.48)	1951	5.14	0.426 (0.259)	16.23 (3.20)	187 (86)	65 (18)	29.08 (98.48)
6th (C1) Gear									
142.36 (106.16)	11460 (50.97)	4.66 (7.50)	1953	4.23	0.434 (0.264)	15.93 (3.14)	187 (86)	66 (19)	29.09 (98.51)
7th (B2) Gear									
146.25 (109.06)	10897 (48.47)	5.03 (8.10)	1947	4.06	0.422 (0.256)	16.39 (3.23)	188 (86)	67 (19)	29.09 (98.51)
8th (C2) Gear									
145.89 (108.79)	9159 (40.74)	5.97 (9.61)	1955	3.39	0.419 (0.255)	16.48 (3.25)	188 (87)	71 (22)	29.09 (98.51)
9th (B3) Gear									
142.95 (106.60)	7370 (32.78)	7.27 (11.71)	1949	2.70	0.430 (0.261)	16.07 (3.17)	189 (87)	73 (23)	29.07 (98.44)
10th (D1) Gear									
141.94 (105.85)	6945 (30.89)	7.66 (12.34)	1948	2.55	0.431 (0.262)	16.05 (3.16)	189 (87)	74 (23)	29.06 (98.41)
11th (C3) Gear									
142.39 (106.18)	6219 (27.66)	8.59 (13.82)	1950	2.27	0.433 (0.263)	15.96 (3.14)	189 (87)	74 (23)	29.05 (98.37)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125°F (52°C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 8870 lb (4023 kg) or 9710 lb (4404 kg) with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1629**, Summary 067, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM

MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
				2nd (A2) Gear					
110.49 (82.39)	17774 (79.06)	2.33 (3.75)	2208	8.71	0.511 [illegible]	13.51 [illegible]	181 (83)	51 [illegible]	29.08 (98.48)
				3rd (A3) Gear					
138.44 [illegible]	14657 [illegible]	3.54 (5.70)	2198	[illegible]	0.449 [illegible]	15.39 [illegible]	184 (84)	58 (14)	29.08 (98.48)
				4th (B1) Gear					
139.85 [illegible]	11727 (52.16)	4.47 [illegible]	2202	4.37	0.444 [illegible]	15.56 [illegible]	186 (85)	63 (17)	29.08 (98.48)
				5th (A4) Gear					
140.72 [illegible]	11488 [illegible]	4.59 [illegible]	2201	4.23	0.440 [illegible]	15.72 [illegible]	181 (83)	64 (18)	29.08 (98.48)
				6th (C1) Gear					
139.90 [illegible]	9932 (44.18)	5.28 (8.50)	2200	3.40	0.443 [illegible]	15.58 [illegible]	186 (85)	65 (18)	29.08 (98.48)
				7th (B2) Gear					
141.77 (105.72)	9291 (41.33)	5.72 (9.21)	2199	3.39	0.441 [illegible]	15.66 [illegible]	186 (86)	68 (20)	29.09 (98.51)
				8th (C2) Gear					
141.47 (105.49)	7848 (34.91)	6.76 (10.88)	2198	2.74	0.439 [illegible]	15.74 [illegible]	186 (86)	70 (21)	29.09 (98.51)
				9th (B3) Gear					
138.52 (103.29)	6306 (28.06)	8.23 (13.25)	2198	2.27	0.444 [illegible]	15.40 [illegible]	187 (86)	72 (22)	29.08 (98.48)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—4th (B1) Gear	76.0
Maximum sound level	76.0
Transport speed—no load—16th (D4) Gear	77.0
Bystander in 16th (D4) Gear	81.0

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2199	1981	1764	1540	1321	1102
Pull—lbs (kN)	9291 (41.33)	10682 (47.52)	11760 (52.31)	12708 (56.53)	12640 (56.23)	12244 (54.46)
Increase in Pull %	0	15	27	37	36	32
Power—Hp (kW)	141.77 (105.72)	145.91 (108.80)	142.40 (106.18)	133.64 (99.66)	114.29 (85.23)	92.24 (68.78)
Speed—Mph (km/h)	5.72 (9.21)	5.12 (8.24)	4.54 (7.31)	3.94 (6.35)	3.39 (5.46)	2.82 (4.55)
Slip %	3.39	3.89	4.36	4.89	4.73	4.73

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2580 (178)
Location	remote outlet
Hydraulic oil temperature °F (°C)	138 (59)
Location	transmission sump
Category	III
Quick attach	Yes

Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	8700 (38.7)	9228 (41.0)	9452 (42.0)	8944 (39.8)	8283 (36.8)
		with 1-44 mm lift assist cylinder			
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	9860 (43.9)	10570 (47.0)	10854 (48.3)	10224 (45.5)	9411 (41.9)
		with 1-55 mm lift assist cylinder			
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb (kN)	10518 (46.8)	11454 (50.9)	11576 (51.5)	10737 (47.8)	10041 (44.7)

TIRES AND WEIGHT	With Ballast	Without Ballast
Rear Tires—No., size, ply & psi (kPa)	Four [illegible]	Two [illegible]
Ballast—Duals (total)	[illegible]	None
—Cast iron (total)	[illegible]	None
Front Tires—No., size, ply & psi (kPa)	Two [illegible]	Two [illegible]
Ballast—Liquid (total)	None	None
—Test Equip (total)	[illegible]	None
Height of Drawbar	[illegible]	[illegible]
Static Weight—Rear	13936 lb (6321 kg)	11025 lb (5001 kg)
—Front	4813 lb (2183 kg)	4820 lb (2186 kg)
—Total	18749 lb (8504 kg)	15845 lb (7187 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

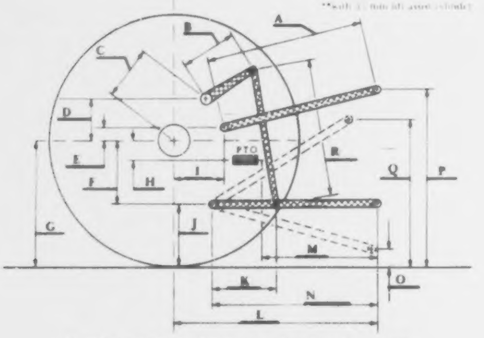
CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range	5821 lbs (25.9 kN) *6614 lbs (29.4 kN) **7057 lbs (31.4 kN)
i) Opening pressure of relief valve	N.A.
Sustained pressure with pump stalled	2580 psi (178 Bar)
ii) Pump delivery rate at minimum pressure	33.5 GPM (126.8 l/min)
iii) Pump delivery rate at maximum hydraulic power	33.9 GPM (128.3 l/min)
Delivery pressure	1750 psi (121 Bar)
Power	34.6 Hp (25.8 kW)

*with 44 mm lift assist cylinder

**with 55 mm lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.1	714
B	18.4	468
C	12.9	327
D	12.9	327
E	6.8	172
F	13.0	330
G	35.1	892
H	7.0	177
I	15.1	384
J	22.1	562
K	28.2	716
L	44.3	1124
L'	49.3	1251
M	22.3	565
N	38.1	968
O	9.1	231
P	44.1	1121
Q	41.5	1053
R	37.3	946

L' to end of Quick Attach

John Deere 4555 Quadrange Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1630—SUMMARY 068
JOHN DEERE 4755 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—998 rpm)					
177.11 (132.07)	2200	9.73 (36.82)	0.379 (0.231)	18.21 (3.59)	
Maximum Power (2 Hours)					
180.35 (134.49)	2000	9.55 (36.17)	0.366 (0.223)	18.88 (3.72)	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
177.11 (132.07)	2200	9.73 (36.82)	0.379 (0.231)	18.21 (3.59)	75°F (24°C)
154.51 (115.22)	2253	8.77 (33.20)	0.395 (0.240)	17.60 (3.47)	Relative humidity
116.72 (87.04)	2281	7.25 (27.45)	0.429 (0.261)	16.10 (3.17)	56%
79.32 (59.15)	2317	5.51 (20.87)	0.480 (0.292)	14.39 (2.83)	Barometer
40.11 (29.91)	2351	3.99 (15.12)	0.688 (0.419)	10.04 (1.98)	28.90" Hg (97.87 kPa)
0.77 (0.58)	2385	2.39 (9.04)	21.556 (12.990)	0.32 (0.06)	

Maximum Torque 575 lb.-ft. (779 Nm) at 1400 rpm
Maximum Torque Rise 35.9%
Torque Rise at 1000 engine rpm 14%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th (C2) Gear									
156.97 (117.05)	8441 (37.55)	6.97 (11.22)	2196	3.44	0.422 (0.257)	16.57 (3.26)	186 (86)	58 (14)	29.27 (99.12)
75% of Pull at Maximum Power—8th (C2) Gear									
122.77 (91.55)	6325 (28.13)	7.28 (11.72)	2266	2.28	0.448 (0.272)	15.43 (3.04)	186 (85)	69 (21)	29.21 (98.92)
50% of Pull at Maximum Power—8th (C2) Gear									
83.99 (62.63)	4223 (18.78)	7.46 (12.00)	2304	1.47	0.516 (0.314)	13.40 (2.64)	180 (82)	69 (21)	29.21 (98.92)
75% of Pull at Reduced Engine Speed—10th (D1) Gear									
123.00 (91.72)	6332 (28.17)	7.28 (11.72)	1777	2.19	0.425 (0.259)	16.25 (3.20)	186 (85)	69 (21)	29.20 (98.88)
50% of Pull at Reduced Engine Speed—10th (D1) Gear									
84.10 (62.71)	4232 (18.82)	7.45 (11.99)	1804	1.47	0.463 (0.282)	14.92 (2.94)	180 (82)	69 (21)	29.20 (98.88)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 4.344 gal *(16.442 l)* **Drained from motor** 4.101 gal *(15.526 l)* **Transmission and hydraulic lubricant** John Deere HyGard fluid **Total time engine was operated** 19.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6076A109849* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" *(115.8 mm × 120.7 mm)* **Compression ratio** 16.0 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prefilter **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 66.6-72.8 lb/hr *(30.2-33.0 kg/hr)* **High idle** 2350-2400 rpm **Turbo boost** nominal 16-19 psi *(110-131 kPa)* as measured 17.0 psi *(117 kPa)*

CHASSIS: Type standard **Serial No.** *RW4755H001852* **Tread width** rear 64.6" *(1642 mm)* to 115.7" *(2938 mm)* front 61.0" *(1550 mm)* to 85.0" *(2160 mm)* **Wheel base** 118.5" *(3010 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.17 *(3.49)* second 2.75 *(4.43)* third 3.91 *(6.30)* fourth 4.84 *(7.80)* fifth 4.97 *(8.00)* sixth 5.69 *(9.16)* seventh 6.15 *(9.90)* eighth 7.22 *(11.63)* ninth 8.75 *(14.09)* tenth 9.22 *(14.84)* eleventh 10.28 *(16.55)* twelfth 11.11 *(17.89)* thirteenth 11.71 *(18.85)* fourteenth 13.05 *(21.01)* fifteenth 16.66 *(26.83)* sixteenth 21.16 *(34.07)* reverse 4.09 *(6.58)*, 5.19 *(8.35)*, 9.13 *(14.70)*, 10.72 *(17.27)*, 11.59 *(18.67)*, 13.62 *(21.93)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 998 rpm at 2200 engine rpm **Unladen tractor mass** 16030 lb *(7271 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 2000 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
127.37 (94.98)	13925 (61.94)	3.43 (5.52)	2240	14.24	0.491 (0.299)	14.09 (2.78)	182 (83)	52 (11)	29.27 (99.12)
4th (B1) Gear									
153.68 (114.60)	13005 (57.85)	4.43 (7.13)	2130	6.51	0.435 (0.265)	15.87 (3.13)	183 (84)	51 (11)	29.27 (99.12)
5th (A4) Gear									
153.19 (114.23)	12851 (57.16)	4.47 (7.19)	2134	7.33	0.435 (0.265)	15.90 (3.13)	183 (84)	54 (12)	29.27 (99.12)
6th (C1) Gear									
156.06 (116.37)	11485 (51.09)	5.10 (8.20)	2079	5.34	0.422 (0.257)	16.36 (3.22)	186 (85)	55 (13)	29.27 (99.12)
7th (B2) Gear									
158.91 (118.50)	11172 (49.70)	5.33 (8.58)	2008	4.32	0.413 (0.251)	16.66 (3.28)	186 (86)	59 (15)	29.27 (99.12)
8th (C2) Gear									
160.43 (119.63)	9540 (42.43)	6.31 (10.15)	1998	3.47	0.409 (0.249)	16.90 (3.33)	188 (86)	57 (14)	29.27 (99.12)
9th (B3) Gear									
158.10 (117.90)	7658 (34.06)	7.74 (12.46)	2005	3.09	0.416 (0.253)	16.60 (3.27)	188 (87)	59 (15)	29.27 (99.12)
10th (D1) Gear									
156.74 (116.88)	7205 (32.06)	8.15 (13.12)	1999	2.73	0.423 (0.257)	16.34 (3.22)	188 (86)	61 (16)	29.27 (99.12)

DRAWBAR PERFORMANCE AT 2000 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool-ing med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
2nd (A2) Gear									
131.94 (98.39)	19557 (86.99)	2.53 (4.07)	2248	10.25	0.468 (0.285)	14.77 (2.91)	183 (84)	64 (18)	28.88 (97.80)
3rd (A3) Gear									
152.56 (113.76)	15860 (70.55)	3.61 (5.81)	2126	4.92	0.438 (0.267)	15.77 (3.11)	187 (86)	72 (22)	28.87 (97.77)
4th (B1) Gear									
154.99 (115.57)	13261 (58.99)	4.38 (7.05)	2062	3.71	0.429 (0.261)	16.13 (3.18)	187 (86)	73 (23)	28.86 (97.73)
5th (A4) Gear									
157.69 (117.59)	13192 (58.68)	4.48 (7.21)	2055	3.62	0.422 (0.257)	16.38 (3.23)	188 (86)	74 (23)	28.86 (97.73)
6th (C1) Gear									
156.02 (116.34)	11652 (51.83)	5.02 (8.08)	2001	3.27	0.423 (0.257)	16.33 (3.22)	188 (86)	75 (24)	28.85 (97.70)
7th (B2) Gear									
159.37 (118.84)	10996 (48.91)	5.44 (8.75)	1999	2.91	0.412 (0.251)	16.76 (3.30)	189 (87)	75 (24)	28.85 (97.70)
8th (C2) Gear									
158.28 (118.03)	9229 (41.05)	6.43 (10.35)	2002	2.56	0.416 (0.253)	16.60 (3.27)	188 (86)	76 (24)	28.84 (97.66)
9th (B3) Gear									
155.16 (115.70)	7432 (33.06)	7.83 (12.60)	2002	1.92	0.424 (0.258)	16.31 (3.21)	189 (87)	77 (25)	28.83 (97.63)
10th (D1) Gear									
154.01 (114.84)	7000 (31.14)	8.25 (13.28)	2000	1.83	0.427 (0.260)	16.18 (3.19)	188 (87)	77 (25)	28.82 (97.60)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 128° F (53° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. This tractor did not meet manufacturers 3 point lift capacity claim of 8870 lb *(4023 kg)* or 9710 lb *(4404 kg)* with lift assist cylinder. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1630**, Summary 068, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2200 RPM
MAXIMUM POWER IN SELECTED GEARS—BALLASTED TRACTOR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom. inch Hg (kPa)
				2nd (A2) Gear					
130.62 (97.41)	19898 (88.51)	2.46 (3.96)	2248	12.70	0.477 (0.290)	14.50 (2.86)	185 (84)	60 (16)	28.88 (97.80)
				3rd (A3) Gear					
152.18 (113.48)	15217 (67.69)	3.75 (6.04)	2201	4.58	0.441 (0.268)	15.66 (3.09)	186 (86)	72 (22)	28.87 (97.77)
				4th (B1) Gear					
152.82 (113.96)	12196 (54.25)	4.70 (7.56)	2201	3.27	0.437 (0.266)	15.82 (3.12)	186 (86)	72 (22)	28.87 (97.77)
				5th (A4) Gear					
154.97 (115.56)	12057 (53.63)	4.82 (7.76)	2200	3.27	0.432 (0.263)	16.00 (3.15)	187 (86)	74 (23)	28.86 (97.73)
				6th (C1) Gear					
154.15 (114.95)	10444 (46.45)	5.54 (8.91)	2197	2.82	0.436 (0.265)	15.85 (3.12)	188 (86)	74 (23)	28.85 (97.70)
				7th (B2) Gear					
155.88 (116.24)	9730 (43.28)	6.01 (9.67)	2201	2.73	0.429 (0.261)	16.09 (3.17)	187 (86)	75 (24)	28.84 (97.66)
				8th (C2) Gear					
155.95 (116.29)	8259 (36.74)	7.08 (11.40)	2198	2.28	0.429 (0.261)	16.10 (3.17)	187 (86)	75 (24)	28.84 (97.66)
				9th (B3) Gear					
151.98 (113.33)	6604 (29.38)	8.63 (13.89)	2202	1.83	0.441 (0.268)	15.68 (3.09)	187 (86)	77 (25)	28.83 (97.63)

TRACTOR SOUND LEVEL WITH CAB	**dB(A)**
Gear closest to 4.7 mph (7.5 km/h)—4th (B1) Gear	76.0
Maximum sound level	76.0
Transport speed—no load—16th (D4) Gear	76.5
Bystander in 16th (D4) Gear	86.5

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2201	1980	1762	1539	1320	1101
Pull—lbs (kN)	9730 (43.28)	11055 (49.18)	12225 (54.38)	13051 (58.05)	13300 (59.16)	12252 (54.50)
Increase in Pull %	0	14	26	34	37	26
Power—Hp (kW)	155.88 (116.24)	158.75 (118.38)	155.59 (116.03)	144.61 (107.83)	126.21 (94.11)	97.32 (72.57)
Speed—Mph (km/h)	6.01 (9.67)	5.38 (8.67)	4.77 (7.68)	4.16 (6.69)	3.56 (5.73)	2.98 (4.79)
Slip %	2.73	3.09	3.27	3.80	3.80	3.45

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2560 (177)
Location	remote outlet
Hydraulic oil temperature °F(°C)	151 (55)
Location	transmission sump
Category	III
Quick attach	Yes

Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb " " " " " " (kN)	8700 (38.7)	9228 (41.0)	9432 (42.0)	8944 (39.8)	8283 (36.8)
			with 1-44 mm. lift assist cylinder		
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb " " " " " " (kN)	9860 (43.9)	10570 (47.0)	10854 (48.3)	10224 (45.5)	9411 (41.9)
			with 1-55 mm. lift assist cylinder		
Hitch point distance to ground level in. (mm)	9.0 (229)	16.0 (406)	25.0 (635)	33.0 (838)	40.0 (1016)
Lift force on frame lb " " " " " " (kN)	10518 (46.8)	11434 (50.9)	11576 (51.5)	10737 (47.8)	10041 (44.7)

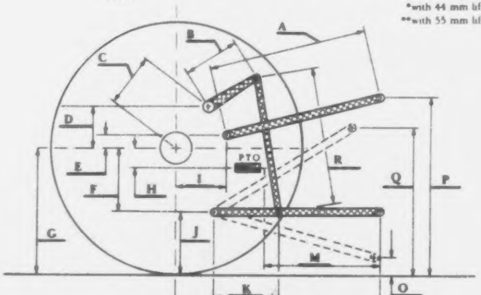
TIRES AND WEIGHT	**With Ballast**	**Without Ballast**
Rear Tires—No., size, ply & psi (kPa)	Four 20.8R42, **, 14 (95)	Two 20.8R42, **, 18 (125)
Ballast—Duals (total)	1950 lb (885 kg)	None
—Cast Iron (total)	2000 lb (907 kg)	None
Front Tires—No., size, ply & psi (kPa)	Two 14L-16.1, 10, 44 (305)	Two 14L-16.1, 10, 44 (305)
Ballast—Liquid (total)	None	None
—Test Equip (total)	340 lb (154 kg)	None
Height of Drawbar	22.5 in (570 mm)	25.5 in (650 mm)
Static Weight—Rear	15450 lb (7008 kg)	11165 lb (5064 kg)
—Front	4870 lb (2209 kg)	4865 lb (2207 kg)
—Total	20320 lb (9217 kg)	16030 lb (7271 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY III
Quick Attach Yes

Maximum Force Exerted Through Whole Range	5821 lbs	(25.9 kN)
	*6614 lbs	(29.4 kN)
	**7057 lbs	(31.4 kN)
i) Opening pressure of relief valve	NA	
Sustained pressure with pump stalled	2560 psi	(177 Bar)
ii) Pump delivery rate at minimum pressure	35.2 GPM	(133.2 l/min)
iii) Pump delivery rate at maximum hydraulic power	33.7 GPM	(127.6 l/min)
Delivery pressure	1750 psi	(121 Bar)
Power	34.4 Hp	(25.7 kW)

*with 44 mm lift assist cylinder
**with 55 mm lift assist cylinder



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.1	714
B	18.4	468
C	12.9	327
D	12.9	327
E	6.8	172
F	13.0	330
G	36.1	918
H	7.0	177
I	15.1	384
J	23.1	588
K	28.2	716
L	44.3	1124
L'	49.3	1251
M	22.3	565
N	38.1	968
O	10.1	257
P	45.1	1146
Q	42.5	1080
R	37.3	946

L' to end of Quick Attach

John Deere 4755 Quadrange Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1631—SUMMARY 069
JOHN DEERE 8760 POWERSHIFT DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1109 rpm)					
260.94 (194.58)	2100	16.33 (61.81)	0.433 (0.263)	15.98 (3.15)	
Maximum Power (2 Hours)					
276.95 (206.52)	1749	15.62 (59.13)	0.396 (0.241)	17.73 (3.49)	
Standard Power Take-off Speed (1003 rpm)					
276.09 (205.88)	1895	16.17 (61.22)	0.405 (0.246)	17.07 (3.36)	
VARYING POWER AND FUEL CONSUMPTION					
260.94 (194.58)	2100	16.33 (61.81)	0.433 (0.263)	15.98 (3.15)	Air temperature
229.26 (170.96)	2172	14.80 (56.04)	0.446 (0.271)	15.49 (3.05)	75°F (24°C)
174.57 (130.17)	2202	12.07 (45.69)	0.478 (0.291)	14.46 (2.85)	Relative humidity
117.72 (87.78)	2232	9.46 (35.81)	0.556 (0.338)	12.44 (2.45)	49%
59.70 (44.52)	2263	6.93 (26.22)	0.804 (0.489)	8.61 (1.70)	Barometer
0.86 (0.64)	2289	4.38 (16.60)	35.130 (21.368)	0.20 (0.04)	29.14" Hg (98.67 kPa)

Maximum Torque 989 lb.-ft. (1341 Nm) at 1501 rpm
Maximum Torque Rise 39.3%
Torque Rise at 1800 engine rpm 12%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
Maximum Power—7th Gear									
239.49 (178.59)	13046 (58.03)	6.88 (11.08)	2096	1.44	0.474 (0.288)	14.59 (2.87)	189 (87)	60 (16)	29.00 (98.21)
75% of Pull at Maximum Power—7th Gear									
187.68 (139.95)	9791 (43.55)	7.19 (11.57)	2184	1.21	0.502 (0.305)	13.78 (2.71)	183 (84)	58 (14)	29.07 (98.44)
50% of Pull at Maximum Power—7th Gear									
127.34 (94.95)	6521 (29.00)	7.32 (11.79)	2218	0.85	0.577 (0.351)	11.98 (2.36)	180 (82)	59 (15)	29.08 (98.48)
75% of Pull at Reduced Engine Speed—9th Gear									
188.31 (140.42)	9798 (43.58)	7.21 (11.60)	1668	1.21	0.439 (0.267)	15.76 (3.10)	185 (85)	58 (14)	29.07 (98.44)
50% of Pull at Reduced Engine Speed—9th Gear									
127.45 (95.04)	6531 (29.05)	7.32 (11.78)	1688	0.94	0.488 (0.297)	14.16 (2.79)	180 (82)	61 (16)	29.08 (98.48)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60°F** *(15°/15°C)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SD **To motor** 6.717 gal *(25.425 l)* **Drained from motor** 6.417 gal *(24.290 l)* **Transmission, hydraulic and final drive lubricant** John Deere HyGard fluid **Total time engine was operated** 22.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *RG6101H100402* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 5.12" × 5.00" *(130.0 mm × 127.0 mm)* **Compression ratio** 15.2 to 1 **Displacement** 619 cu in *(10144 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** 3 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 106.1-115.9 lb/hr *(48.1-52.6 kg/hr)* **High idle** 2225-2325 rpm **Turbo boost** nominal 18-22 psi *(124-152 kPa)* as measured 20.0 psi *(138 kPa)*

CHASSIS: Type four wheel drive with duals **Serial No.** *RW8760P001410* **Tread width** rear 73.7" *(1871 mm)* to 132.0" *(3352 mm)* front 73.7" *(1871 mm)* to 132.0" *(3352 mm)* **Wheel base** 133.9" *(3400 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.28 *(3.67)* second 3.02 *(4.86)* third 3.97 *(6.39)* fourth 4.65 *(7.48)* fifth 5.36 *(8.63)* sixth 6.16 *(9.92)* seventh 7.10 *(11.43)* eighth 8.09 *(13.02)* ninth 9.32 *(15.00)* tenth 10.92 *(17.59)* eleventh 14.48 *(23.32)* twelfth 19.00 *(30.60)* reverse 2.82 *(4.54)*, 5.74 *(9.25)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 32095 lb *(14558 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1750 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
2nd Gear									
231.76 (172.82)	31671 (140.88)	2.74 (4.42)	2000	5.99	0.488 (0.297)	14.17 (2.79)	186 (85)	66 (19)	28.77 (97.43)
3rd Gear									
246.69 (183.96)	27575 (122.66)	3.35 (5.40)	1863	4.12	0.450 (0.274)	15.55 (3.06)	189 (87)	68 (20)	28.78 (97.46)
4th Gear									
247.97 (184.91)	25214 (112.16)	3.69 (5.94)	1749	3.45	0.437 (0.266)	15.83 (3.12)	190 (88)	66 (19)	28.89 (97.83)
5th Gear									
250.31 (186.66)	21908 (97.45)	4.29 (6.90)	1752	2.68	0.433 (0.263)	15.96 (3.14)	190 (88)	66 (19)	28.92 (97.93)
6th Gear									
252.89 (188.58)	19173 (85.29)	4.95 (7.96)	1749	1.99	0.429 (0.261)	16.13 (3.18)	190 (88)	59 (15)	29.01 (98.24)
7th Gear									
255.34 (190.40)	16751 (74.51)	5.72 (9.20)	1748	1.91	0.422 (0.257)	16.38 (3.23)	191 (88)	61 (16)	28.99 (98.17)
8th Gear									
251.73 (187.71)	14446 (64.26)	6.53 (10.52)	1750	1.36	0.429 (0.261)	16.11 (3.17)	191 (88)	63 (17)	28.97 (98.10)
9th Gear									
252.04 (187.95)	12490 (55.56)	7.57 (12.18)	1754	1.29	0.431 (0.262)	16.02 (3.16)	192 (89)	65 (18)	28.95 (98.04)
10th Gear									
251.35 (187.43)	10619 (47.24)	8.88 (14.29)	1752	1.21	0.434 (0.264)	15.90 (3.13)	192 (89)	66 (19)	28.94 (98.00)

DRAWBAR PERFORMANCE AT 2100 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) cooling med	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
1st Gear									
186.24 (138.88)	32360 (143.94)	2.16 (3.47)	2181	7.64	0.521 (0.317)	13.26 (2.61)	184 (84)	66 (19)	28.78 (97.46)
2nd Gear									
231.58 (172.69)	30737 (136.72)	2.83 (4.55)	2100	5.10	0.488 (0.297)	14.15 (2.79)	185 (85)	65 (18)	28.77 (97.43)
3rd Gear									
236.81 (176.59)	23522 (104.63)	3.78 (6.08)	2099	3.19	0.477 (0.290)	14.48 (2.85)	187 (86)	69 (21)	28.78 (97.46)
4th Gear									
236.83 (176.61)	19850 (88.30)	4.47 (7.20)	2100	2.25	0.476 (0.289)	14.52 (2.86)	189 (87)	66 (19)	28.91 (97.90)
5th Gear									
241.82 (180.32)	17503 (77.86)	5.18 (8.34)	2101	1.99	0.466 (0.283)	14.85 (2.92)	189 (87)	66 (19)	28.93 (97.97)
6th Gear									
237.30 (176.95)	14909 (66.32)	5.97 (9.61)	2100	1.56	0.477 (0.290)	14.49 (2.85)	188 (87)	58 (14)	29.02 (98.27)
7th Gear									
239.49 (178.59)	13046 (58.03)	6.88 (11.08)	2096	1.44	0.474 (0.288)	14.59 (2.87)	189 (87)	60 (16)	29.00 (98.21)
8th Gear									
234.55 (174.91)	11180 (49.73)	7.87 (12.66)	2099	1.29	0.480 (0.292)	14.40 (2.84)	189 (87)	62 (17)	28.98 (98.14)
9th Gear									
235.19 (175.38)	9719 (43.23)	9.07 (14.60)	2097	1.12	0.483 (0.294)	14.31 (2.82)	189 (87)	64 (18)	28.96 (98.07)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 153° F (67° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 1st and 2nd gears was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1631**, Summary 069, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—4th Gear	77.5
Maximum sound level	78.5
Transport speed—no load—12th Gear	78.0
Bystander in 12th Gear	90.0

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2086	1892	1685	1471	1261	1048
Pull—lbs	13046	15354	17407	18117	16681	14932
(kN)	*(58.03)*	*(68.30)*	*(77.43)*	*(80.59)*	*(74.20)*	*(66.42)*
Increase in Pull %	0	18	33	39	28	14
Power—Hp	239.49	253.70	255.14	231.83	183.34	136.69
(kW)	*(178.59)*	*(189.18)*	*(190.25)*	*(172.88)*	*(136.72)*	*(101.93)*
Speed—Mph	6.88	6.20	5.50	4.80	4.12	3.43
(km/h)	*(11.08)*	*(9.97)*	*(8.85)*	*(7.72)*	*(6.63)*	*(5.52)*
Slip %	1.47	1.91	2.08	2.25	2.08	1.73

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi *(bar)*	2500 *(172)*
Location	remote outlet
Hydraulic oil temperature °F (°C)	148 (64)
Location	hydraulic sump
Category	III
Quick attach	Yes

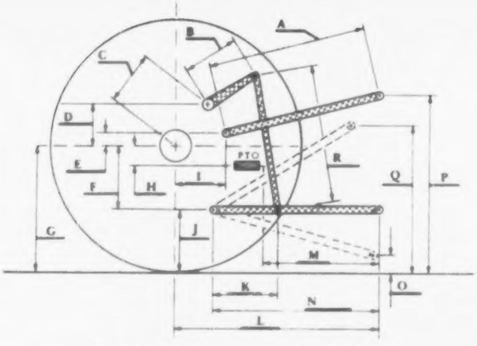
Hitch point distance to ground level in. *(mm)*	8.9 *(226)*	16.2 *(411)*	26.4 *(671)*	34.4 *(874)*	40.2 *(1021)*
Lift force on frame lb	16073	16338	16417	15822	14983
(kN)	*(71.5)*	*(72.7)*	*(73.0)*	*(70.4)*	*(66.6)*

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4R42 ** 14 *(95)*
Front Tires	—No., size, ply & psi *(kPa)*	Four 18.4R42 ** 14 *(95)*
Height of Drawbar		17.5 in. *(445 mm)*
Static Weight	—Rear	14335 lb *(6502 kg)*
	—Front	17760 lb *(8056 kg)*
	—Total	32095 lb *(14558 kg)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY III
Quick Attach Yes

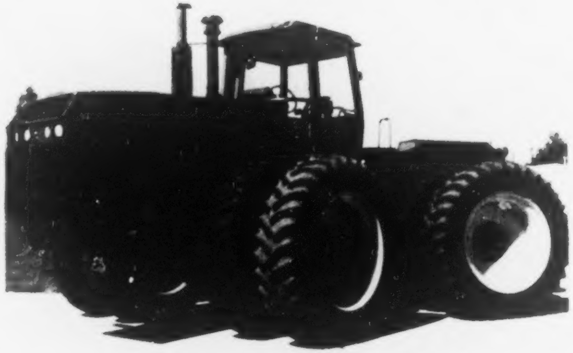
Maximum Force Exerted Through Whole Range	11000 lbs *(48.9 kN)*
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2500 psi *(172 Bar)*
ii) Pump delivery rate at minimum pressure	46.1 GPM *(174.5 l/min)*
iii) Pump delivery rate at maximum hydraulic power	43.5 GPM *(164.7 l/min)*
Delivery pressure	1800 psi *(124 Bar)*
Power	45.7 Hp *(34.1 kW)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.5	*800*
B	18.6	*472*
C	26.2	*666*
D	24.4	*620*
E	11.3	*288*
F	13.8	*350*
G	35.1	*892*
H	4.8	*122*
I	22.7	*577*
J	21.3	*542*
K	28.8	*731*
L	55.3	*1405*
L'	61.8	*1570*
M	25.4	*645*
N	44.0	*1117*
O	7.9	*201*
P	48.3	*1228*
Q	40.3	*1024*
R	44.8	*1137*

L' to end of Quick attach



John Deere 8760 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA OECD TRACTOR TEST 1632—SUMMARY 070
JOHN DEERE 8960 POWERSHIFT DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1002 rpm)					
332.23 (247.74)	1900	18.65 (70.60)	0.406 (0.247)	16.20 [illegible]	
Maximum Power (2 Hours)					
337.42 (251.62)	1740	19.27 (72.93)	0.399 (0.243)	17.51 (3.45)	

VARYING POWER AND FUEL CONSUMPTION

Power Hp (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
332.23 (247.74)	1900	18.65 (70.60)	0.406 (0.247)	16.20	Air temperature
290.28 (216.46)	1987	18.85 [illegible]	0.442 (0.269)	[illegible]	74° F (23° C)
227.[illegible] [illegible]	2015	15.96 [illegible]	0.481 (0.293)	14.27 [illegible]	Relative humidity
151.39 (112.89)	2052	12.35 [illegible]	0.566 (0.344)	[illegible]	3[illegible]%
77.49 (57.78)	2080	9.03 (34.19)	0.809 (0.492)	8.58 [illegible]	Barometer
0.95 [illegible]	2131	6.36 (24.08)	44.685 (27.18)	[illegible]	29.08" Hg (98.47 kPa)

Maximum Torque 1279 lb-ft (1734 Nm) at 1250 rpm
Maximum Torque Rise 39.3%
Torque Rise at 1900 engine rpm 30%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—6th Gear									
302.04 (225.23)	17625 (78.40)	6.43 (10.34)	1899	2.18	0.447 (0.272)	15.45 (3.04)	186 (86)	58 (14)	29.13 (98.65)
75% of Pull at Maximum Power—6th Gear									
243.50 (181.58)	13219 (58.80)	6.91 (11.12)	2030	1.64	0.523 (0.318)	13.22 (2.60)	181 (83)	58 (14)	29.11 (98.58)
50% of Pull at Maximum Power—6th Gear									
165.56 (123.46)	8820 (39.23)	7.04 (11.33)	2059	1.27	0.570 (0.347)	12.12 (2.39)	178 (81)	58 (14)	29.10 (98.54)
75% of Pull at Reduced Engine Speed—8th Gear									
243.52 (181.44)	13225 (58.82)	6.90 (11.11)	1544	1.75	0.422 (0.257)	16.36 (3.22)	185 (85)	58 (14)	29.11 (98.58)
50% of Pull at Reduced Engine Speed—8th Gear									
165.76 (123.61)	8813 (39.20)	7.05 (11.35)	1571	1.38	0.465 (0.283)	14.86 (2.93)	179 (81)	58 (14)	29.10 (98.54)

Location of Test: Center for Agricultural Equipment, Lincoln, Nebraska 68583-0832 U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL, OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 **Specific gravity converted to 60°/60° F** *(15°/15°C)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W40 **API service classification** CD/SF **To motor** 8.880 gal *(33.6 l)* **Drained from motor** 7.053 gal *(26.7 l)* **Transmission, hydraulic and final drive lubricant** John Deere Hy-Gard fluid **Total time engine was operated** 22.1 hours

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 11527700 **Crankshaft** lengthwise **Rated engine speed** 1900 **Bore and stroke** (as specified) 5.50" × 6.00" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.0 to 1 **Displacement** 855 cu in *(14011 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Fuel cooler** radiator for injection pump return fuel **Muffler** vertical **Cooling medium temperature control** one thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 130.2-142.1 lb/hr *(59.0-64.5 kg/hr)* **High idle** 2080-2180 rpm **Turbo boost** nominal 19-23 psi *(131-159 kPa)* as measured 21.5 psi *(148 kPa)*

CHASSIS: Type four wheel drive with duals **Serial No.** *RW8960P001169* **Tread width** rear 78.8" *(2002 mm)* to 144.1" *(3659 mm)* front 78.8" *(2002 mm)* to 144.1" *(3659 mm)* **Wheel base** 133.9" *(3400 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 2.43 *(3.91)* second 3.22 *(5.18)* third 4.22 *(6.80)* fourth 4.94 *(7.96)* fifth 5.71 *(9.19)* sixth 6.56 *(10.56)* seventh 7.56 *(12.17)* eighth 8.61 *(13.86)* ninth 9.92 *(15.98)* tenth 11.63 *(18.73)* eleventh 15.41 *(24.82)* twelfth 20.23 *(32.58)* reverse 3.00 *(4.83)*, 6.12 *(9.85)*. **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic and articulated **Power take-off** 1003 rpm at 1900 engine rpm **Unladen tractor mass** 35115 lb *(15928 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

DRAWBAR PERFORMANCE AT 1750 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
1st Gear									
222.34 (165.80)	33913 (150.85)	2.39 (3.84)	2024	7.82	0.488 (0.297)	14.17 [illegible]	181 (83)	49 (9)	29.54 (99.76)
2nd Gear									
284.31 (212.01)	34795 (154.77)	3.06 (4.93)	1944	7.17	0.463 (0.282)	14.96 (2.94)	181 (83)	47 (8)	29.54 (99.76)
3rd Gear									
301.01 (224.47)	30143 (134.08)	3.74 (6.03)	1765	4.66	0.443 (0.269)	15.61 (3.07)	184 (84)	69 (21)	29.12 (98.61)
4th Gear									
304.47 (227.04)	25916 (115.28)	4.41 (7.09)	1752	3.79	0.437 (0.266)	15.81 (3.11)	183 (84)	72 (22)	29.11 (98.58)
5th Gear									
304.24 (226.87)	22304 (99.21)	5.12 (8.23)	1752	2.99	0.437 (0.266)	15.82 (3.12)	190 (88)	74 (23)	29.11 (98.58)
6th Gear									
307.78 (229.51)	19562 (87.02)	5.90 (9.50)	1750	2.63	0.430 (0.262)	16.06 (3.16)	190 (88)	75 (24)	29.10 (98.54)
7th Gear									
307.19 (229.07)	16888 (75.12)	6.82 (10.98)	1748	2.18	0.431 (0.262)	16.02 (3.15)	190 (88)	77 (25)	29.10 (98.54)
8th Gear									
303.39 (226.38)	14565 (64.79)	7.82 (12.58)	1753	1.82	0.435 (0.265)	15.88 (3.13)	191 (88)	80 (27)	29.09 (98.51)
9th Gear									
303.93 (226.66)	12634 (56.20)	9.02 (14.52)	1730	1.64	0.436 (0.265)	15.86 (3.12)	189 (87)	82 (28)	29.09 (98.51)

DRAWBAR PERFORMANCE AT 1900 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cooling med	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
289.00 (215.51)	34967 (155.54)	3.10 (4.99)	1953	6.51	0.451 (0.275)	15.31 (3.02)	184 (84)	45 (7)	29.54 (99.76)
3rd Gear									
300.36 (223.98)	27737 (123.38)	4.06 (6.54)	1896	3.96	0.448 (0.273)	15.41 (3.04)	184 (84)	66 (19)	29.11 (98.58)
4th Gear									
300.22 (223.87)	23470 (104.40)	4.80 (7.72)	1896	3.26	0.456 (0.278)	15.14 (2.98)	188 (87)	71 (22)	29.11 (98.58)
5th Gear									
302.90 (225.88)	20415 (90.81)	5.56 (8.95)	1898	2.65	0.449 (0.273)	15.39 (3.03)	189 (87)	73 (23)	29.11 (98.58)
6th Gear									
302.04 (225.23)	17625 (78.40)	6.43 (10.34)	1899	2.18	0.447 (0.272)	15.45 (3.04)	186 (86)	58 (14)	29.13 (98.65)
7th Gear									
300.54 (224.11)	15160 (67.44)	7.43 (11.96)	1900	2.00	0.449 (0.273)	15.38 (3.03)	191 (88)	78 (26)	29.10 (98.54)
8th Gear									
298.53 (222.61)	13185 (58.64)	8.49 (13.67)	1901	1.82	0.454 (0.276)	15.23 (3.00)	185 (85)	58 (14)	29.12 (98.61)

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 102° F (39° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 1st and 2nd gears was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1632**, Summary 070, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Gear closest to 4.7 mph (7.5 km/h)—3rd Gear	74.0
Maximum sound level	80.0
Transport speed—no load—12th Gear	79.0
Bystander in 12th Gear	90.0

LUGGING ABILITY IN 6th GEAR

Crankshaft Speed rpm	1900	1712	1520	1328	1139	960
Pull—lbs	17625	20207	22115	24277	24863	22730
kN	78.40	89.88	98.38	107.99	110.60	101.11
Increase in Pull %	0	15	25	38	41	29
Power—Hp	302.04	311.25	301.44	287.18	252.50	195.17
kW	225.23	232.10	224.78	214.15	188.29	145.54
Speed—Mph	6.43	5.78	5.11	4.44	3.81	3.22
km/h	10.34	9.30	8.23	7.14	6.13	5.18
Slip %	2.18	2.34	2.72	3.29	3.44	3.08

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi (bar)	2500 (172)
Location	remote outlet
Hydraulic oil temperature °F (°C)	130 (54)
Location	hydraulic sump
Category	IV
Quick attach	Yes

Hitch point distance to ground level in. (mm)	9.0 (229)	16.2 (412)	26.4 (670)	38.4 (975)	46.0 (1168)
Lift force on frame lb.	15978	16568	16014	15554	15968
kN	71.1	73.7	71.2	69.2	71.0

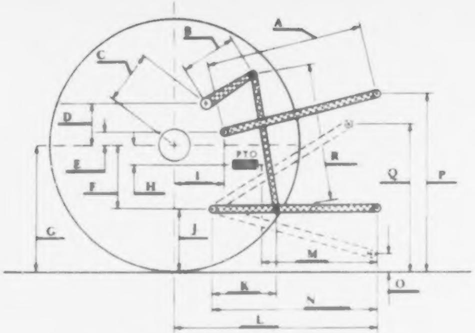
TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 20.8R42 ** 14 (97)
Front Tires	—No., size, ply & psi (kPa)	Four 20.8R42 ** 14 (97)
Height of Drawbar		19.0 in (483 mm)
Static Weight	—Rear	15535 lb (7047 kg)
	—Front	19580 lb (8881 kg)
	—Total	35115 lb (15928 kg)

THREE POINT HITCH PERFORMANCE
(OECD Static Test)

CATEGORY: IV

Quick Attach: Yes

Maximum Force Exerted Through Whole Range	11701 lbs (52.0 kN)
i) Opening pressure of relief valve	NA
Sustained pressure with pump stalled	2510 psi (173 *Bar*)
ii) Pump delivery rate at minimum pressure	45.1 GPM (171.2 l/min)
iii) Pump delivery rate at maximum hydraulic power	39.9 GPM (151.0 l/min)
Delivery pressure	1900 psi (131 *Bar*)
Power	44.2 Hp (33.0 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.0	787
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	351
G	36.1	918
H	4.8	122
I	22.7	577
J	22.3	568
K	28.3	718
L	54.5	1385
L*	60.3	1532
M	24.6	625
N	43.2	1097
O	8.9	226
P	49.3	1254
Q	40.0	1016
R	41.6	1117

L* to end of Quick attach

John Deere 8960 Powershift Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1633—DEUTZ ALLIS 9150 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1021 rpm)									
	151.07 (112.65)	2400	9.274 (35.106)	0.424 (0.258)	16.29 (3.21)	205 (96)	55 (13)	75 (24)	28.88 (97.78)
Standard Power Take-off Speed (1000 rpm)—One Hour									
	150.22 (112.02)	2350	9.119 (34.518)	0.419 (0.255)	16.47 (3.25)	205 (96)	55 (13)	75 (24)	28.89 (97.83)
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	131.72 (98.22)	2463	8.470 (32.064)	0.444 (0.270)	15.55 (3.06)	197 (92)	56 (13)	74 (23)	
		2575	2.451 (9.281)			187 (86)	56 (13)	76 (24)	
	67.00 (49.96)	2511	5.488 (20.775)	0.566 (0.344)	12.21 (2.41)	174 (79)	56 (13)	76 (24)	
	151.89 (113.26)	2400	9.260 (35.053)	0.421 (0.256)	16.40 (3.23)	205 (96)	56 (13)	75 (24)	
	34.02 (25.37)	2546	3.951 (14.955)	0.802 (0.488)	8.61 (1.70)	174 (79)	55 (13)	75 (23)	
	99.71 (74.35)	2487	6.955 (26.328)	0.482 (0.293)	14.34 (2.82)	183 (84)	55 (13)	75 (24)	
Av **Av**	**80.81** ***(60.26)***	**2497**	**6.093** ***(23.063)***	**0.521** ***(0.317)***	**13.26** ***(2.61)***	**187** ***(86)***	**56** ***(13)***	**75** ***(24)***	**28.85** ***(97.70)***

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3D) Gear											
132.71 (98.96)	9699 (43.14)	5.13 (8.26)	2400	2.68	9.132 (34.567)	0.475 (0.289)	14.53 (2.86)	183 (84)	40 (4)	51 (11)	28.69 (97.14)
75% of Pull at Maximum Power—Ten Hours 8th (3D) Gear											
105.29 (78.51)	7406 (32.94)	5.33 (8.58)	2478	2.01	7.880 (29.829)	0.517 (0.315)	13.36 (2.63)	179 (82)	47 (8)	58 (15)	28.62 (96.92)
50% of Pull at Maximum Power—Two Hours 8th (3D) Gear											
71.46 (53.29)	4938 (21.97)	5.43 (8.73)	2539	1.53	6.245 (23.638)	0.604 (0.367)	11.44 (2.25)	159 (70)	41 (5)	51 (11)	28.88 (97.80)
50% of Pull at Reduced Engine Speed—Two Hours 13th (5D) Gear											
71.52 (53.33)	4938 (21.97)	5.43 (8.74)	1619	1.49	4.682 (17.722)	0.452 (0.275)	15.28 (3.01)	173 (78)	45 (7)	57 (14)	28.81 (97.54)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Gear	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
119.68 (89.25)	17334 (77.11)	2.59 (4.17)	2442	12.99	4th (1O) Gear	167 (75)	38 (3)	45 (7)	28.88 (97.80)
130.66 (97.43)	16611 (73.89)	2.95 (4.75)	2398	7.64	5th (2D) Gear	179 (82)	39 (4)	50 (10)	28.70 (97.19)
133.15 (99.29)	13632 (60.64)	3.66 (5.89)	2401	4.17	6th (2O) Gear	182 (83)	39 (4)	50 (10)	28.71 (97.22)
132.48 (98.79)	11781 (52.40)	4.22 (6.79)	2401	3.27	7th (3L) Gear	182 (83)	38 (3)	49 (9)	28.72 (97.26)
135.28 (100.88)	9875 (43.93)	5.14 (8.27)	2402	2.68	8th (3D) Gear	182 (83)	40 (4)	52 (11)	28.68 (97.12)
131.78 (98.27)	8908 (39.62)	5.55 (8.93)	2400	2.51	9th (4L) Gear	183 (84)	40 (4)	51 (11)	28.69 (97.16)
132.33 (98.68)	8060 (35.85)	6.16 (9.91)	2401	2.26	10th (3O) Gear	185 (85)	40 (4)	51 (11)	28.68 (97.12)
132.54 (98.84)	7516 (33.43)	6.61 (10.64)	2401	2.09	11th (5L) Gear	184 (84)	40 (4)	51 (11)	28.68 (97.12)
134.82 (100.54)	7502 (33.37)	6.74 (10.85)	2401	2.00	12th (4D) Gear	182 (83)	40 (4)	52 (11)	28.68 (97.12)
134.00 (99.93)	6263 (27.86)	8.02 (12.91)	2401	1.75	13th (5D) Gear	183 (84)	40 (4)	52 (11)	28.68 (97.12)

Department of Agricultural Engineering

Dates of Test: November 2-14, 1989

Manufacturer: WHITE NEW IDEA FARM EQUIPMENT CO., 123 West Sycamore Street, Coldwater, Ohio 45828

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8300 **Fuel weight** 6.910 **lbs/gal** *(0.828 kg/l)* **Oil SAE** 15W-40 **API service classification** CE, CD-II, SG **To motor** 4.295 **gal** *(16.257 l)* **Drained from motor** 2.852 gal *(10.795 l)* **Transmission and final drive lubricant** Deutz Allis Power Fluid 821-XL **Total time engine was operated** 32.0 hours

ENGINE: Make Klockner-Humboldt-Deutz Ag Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** 7650794 **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** (as specified) 4.016" × 4.921" *(102 mm × 125 mm)* **Compression ratio** 15.5 to 1 **Displacement** 374 cu in *(6129 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** radiator for crankcase oil, separate radiators for transmission and powershift oils **Fuel filter** two paper cartridges **Fuel cooler** radiator for injection pump return fuel **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** air cooled with variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 62.8-67.2 lb/h *(28.5-30.5 kg/h)* **High idle** 2550-2600 rpm **Turbo boost** nominal 11.3-13.8 psi *(78-95 kPa)* as measured 13.0 psi *(90 kPa)*

CHASSIS: Type standard with duals **Serial No.** *9150T-1071* **Tread width** rear 64" *(1626 mm)* to 125" *(3175 mm)* front 67.0" *(1700 mm)* to 91.0" *(2310 mm)* **Wheel base** 120" *(3048 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.4" *(773 mm)* Vertical distance above roadway 39.2" *(995 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.9 *(3.1)* second 2.3 *(3.8)* third 2.5 *(4.1)* fourth 2.8 *(4.5)* fifth 3.1 *(4.9)* sixth 3.7 *(5.9)* seventh 4.2 *(6.7)* eighth 5.1 *(8.1)* ninth 5.4 *(8.8)* tenth 6.0 *(9.7)* eleventh 6.5 *(10.4)* twelfth 6.6 *(10.6)* thirteenth 7.8 *(12.6)* fourteenth 7.9 *(12.7)* fifteenth 9.3 *(15.0)* sixteenth 13.9 *(22.4)* seventeenth 16.8 *(27.1)* eighteenth 20.1 *(32.4)* reverse 2.2 *(3.6)*, 2.7 *(4.4)*, 3.3 *(5.2)*, 4.8 *(7.8)*, 5.9 *(9.5)* 7.0 *(11.3)* **Clutch** dry disc operated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 161" *(4.09 m)* left 167" *(4.24 m)* (on concrete surface without brake) right 259" *(6.58 m)* left 260" *(6.60 m)* **Turning space diameter** (on concrete surface with brake applied) right 329" *(8.36 m)* left 341" *(8.66 m)* (on concrete surface without brake) right 552" *(14.02 m)* left 549" *(13.95 m)* **Power take-off** 540 rpm at 2379 engine rpm and 1000 rpm at 2351 engine rpm **Unladen tractor mass** 14285 lb *(6480 kg)*

LUGGING ABILITY IN 8th (3D) GEAR

Crankshaft Speed rpm	2402	2168	1913	1688	1433	1196
Pull—lbs (kN)	9875 (43.93)	10610 (47.20)	11488 (51.10)	12449 (55.38)	12838 (57.11)	11125 (49.48)
Increase in Pull %	0	7	16	26	30	13
Power—Hp (kW)	135.28 (100.88)	130.92 (97.63)	124.65 (92.95)	118.83 (88.61)	103.91 (77.49)	75.60 (56.38)
Speed—Mph (km/h)	5.14 (8.27)	4.63 (7.45)	4.07 (6.55)	3.58 (5.76)	3.04 (4.88)	2.55 (4.10)
Slip %	2.68	2.85	3.19	3.52	3.68	3.19

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	75.5
75% of Pull at Maximum Power—Ten Hours	76.0
50% of Pull at Maximum Power—Two Hours	75.5
50% of Pull at Reduced Engine Speed—Two Hours	74.5
Bystander in 18th (6O) gear	86.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 20.8R38 * 12 (83)	Four 20.8R38 * 12 (83)
Ballast	—Liquid (each)	524 lb (238 kg)	None
	—Test Equip (each)	60 lb (27 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 14L-16.1, 6, 28 (193)	Two 14L-16.1, 6, 28 (193)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	187 lb (85 kg)	None
Height of Drawbar		22 in (560 mm)	22 in (560 mm)
Static Weight with Operator	—Rear	14260 lb (6468 kg)	11925 lb (5409 kg)
	—Front	4365 lb (1980 kg)	3990 lb (1810 kg)
	—Total	18625 lb (8448 kg)	15915 lb (7219 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125°F *(52°C)*. Ten gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The cooling air temperature was measured in the airstream of cylinder number 5. The report reflects the test on the tractor equipped with the above hood air inlet.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1633**, February 8, 1990.

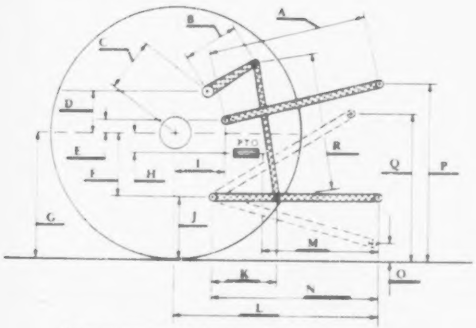
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa) [illegible]
Location [illegible]
Hydraulic oil temperature °F (°C) [illegible]
Location [illegible]

	Maximum Lift Capacity		with boost cylinder	
QUICK ATTACH	No		No	
CATEGORY	III		III	
LOAD lb (kN)	[illegible]		[illegible]	[illegible]
TIME sec	[illegible]		[illegible]	
HITCH POINT MOVEMENT in. (mm)				
Lowest position	[illegible]	[illegible]	[illegible]	[illegible]
Top of transport range	[illegible]	[illegible]	[illegible]	[illegible]
Highest position	[illegible]	[illegible]	[illegible]	[illegible]
LOAD CG MOVEMENT in. (mm)				
Lowest position	[illegible]	[illegible]	[illegible]	[illegible]
Top of transport range	[illegible]	[illegible]	[illegible]	[illegible]
Highest position	[illegible]	[illegible]	[illegible]	[illegible]



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	24.9	*632*
B	16.0	*406*
C	20.1	*511*
D	18.6	*472*
E	10.4	*263*
F	10.2	*260*
G	32.5	*826*
H	1.9	*48*
I	19.9	*506*
J	22.3	*566*
K	21.8	*553*
L	45.3	*1151*
M	22.3	*566*
N	34.8	*884*
O	8.0	*203*
P	44.3	*1125*
Q	36.3	*922*
R	38.5	*978*

Deutz Allis 9150 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1634—DEUTZ ALLIS 9170 DIESEL
18 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperatures °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1061 rpm)									
	173.17 *([illegible])*	2300	11.917 *([illegible])*	0.459 *([illegible])*	15.74 *([illegible])*	178 *(81)*	52 *(11)*	71 *(21)*	29.26 *([illegible])*
Standard Power Take-off Speed (1000 rpm)—One Hour									
	178.70 *([illegible])*	2167	10.882 *([illegible])*	0.415 *([illegible])*	[illegible] *([illegible])*	180 *(82)*	52 *([illegible])*	74 *(23)*	29.21 *([illegible])*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	150.83 *(112.47)*	2353	10.472 *(39.638)*	0.486 *(0.296)*	14.40 *(2.84)*	183 *(84)*	55	80 *(26)*	
	—	2484	3.352 *(12.687)*			193 *(89)*	52	73 *(23)*	
	76.28 *(56.88)*	2392	6.491 *(24.571)*	0.584 *(0.355)*	11.85 *(2.34)*	174 *(79)*	54 *(12)*	77 *(25)*	
	[illegible]	2366	10.628 *(40.232)*	0.444 *(0.270)*	15.57 *([illegible])*	[illegible]	54	75 *(24)*	
	38.85 *(28.97)*	2423	4.793 *(18.144)*	0.853 *(0.519)*	8.10 *(1.60)*	182 *(83)*	54	75 *(24)*	
	113.20 *(84.41)*	2334	8.292 *(31.390)*	0.506 *(0.308)*	13.66 *(2.69)*	171 *(77)*	55 *(13)*	79 *(26)*	
Av **Av**	**90.99** ***(67.85)***	**2384**	**7.288** ***(27.588)***	**0.553** ***(0.337)***	**12.49** ***(2.46)***	**179** ***(82)***	**54** ***(12)***	**76** ***(25)***	**29.22** ***(98.95)***

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3D) Gear											
155.86 *(116.22)*	11857 *(52.74)*	4.93 *(7.93)*	2301	3.29	11.143 *(42.182)*	0.494 *([illegible])*	13.98 *([illegible])*	164 *([illegible])*	41	46	28.72 *(97.26)*
75% of Pull at Maximum Power—Ten Hours 8th (3D) Gear											
123.97 *(92.44)*	9055 *(40.28)*	5.13 *(8.26)*	2377	2.43	9.734 *(36.847)*	0.545 *(0.330)*	12.74 *(2.51)*	143 *(61)*	44	50 *(10)*	28.81 *(97.55)*
50% of Pull at Maximum Power—Two Hours 8th (3D) Gear											
84.55 *(63.04)*	6037 *(26.85)*	5.25 *(8.45)*	2414	1.79	7.887 *(29.856)*	0.645 *(0.392)*	10.72 *(2.11)*	142 *(61)*	47 *(8)*	57 *(14)*	28.65 *(96.94)*
50% of Pull at Reduced Engine Speed—Two Hours 14th (5D) Gear											
84.53 *(63.04)*	6037 *(26.85)*	5.25 *(8.45)*	1557	1.66	5.543 *(20.981)*	0.453 *(0.276)*	15.25 *(3.00)*	148 *(64)*	46 *(8)*	58 *(14)*	28.50 *(96.52)*
MAXIMUM POWER IN SELECTED GEARS											
137.24 *(102.34)*	19027 *(84.64)*	2.70 *(4.35)*	2536	13.67	5th (2D) Gear			146 *(63)*	41 *(5)*	44 *(7)*	28.71 *(97.22)*
154.02 *(114.85)*	16775 *(74.62)*	3.44 *(5.54)*	2299	5.73	6th (2O) Gear			155 *(68)*	43 *(6)*	53 *(12)*	28.74 *(97.31)*
155.79 *(116.17)*	14607 *(64.97)*	4.00 *(6.44)*	2300	4.27	7th (3L) Gear			153 *(67)*	42 *(6)*	52 *(11)*	28.74 *(97.33)*
158.66 *(118.31)*	12073 *(53.70)*	4.93 *(7.93)*	2301	3.19	8th (3D) Gear			157 *(69)*	43 *(6)*	53 *(12)*	28.79 *(97.49)*
154.82 *(115.45)*	10977 *(48.83)*	5.29 *(8.51)*	2300	2.94	9th (4L) Gear			155 *(68)*	43 *(6)*	53 *(12)*	28.74 *(97.31)*
156.36 *(116.60)*	9990 *(44.44)*	5.87 *(9.45)*	2300	2.60	10th (3O) Gear			157 *(69)*	43 *(6)*	54 *(12)*	28.74 *(97.31)*
155.24 *(115.76)*	9229 *(41.05)*	6.31 *(10.15)*	2298	2.43	11th (5L) Gear			160 *(71)*	45 *(7)*	55 *(13)*	28.73 *(97.29)*
158.50 *(118.19)*	9170 *(40.79)*	6.48 *(10.43)*	2300	2.41	12th (4D) Gear			157 *(69)*	44 *(7)*	55 *(13)*	28.73 *(97.29)*
154.35 *(115.10)*	7502 *(33.37)*	7.72 *(12.42)*	2300	2.00	13th (4O) Gear			160 *(72)*	44 *(7)*	55 *(13)*	28.72 *(97.26)*
157.63 *(117.54)*	7661 *(34.08)*	7.72 *(12.42)*	2298	2.00	14th (5D) Gear			161 *(72)*	44 *(7)*	55 *(13)*	28.71 *(97.22)*
151.49 *(112.97)*	6178 *(27.48)*	9.20 *(14.80)*	2302	1.57	15th (5O) Gear			158 *(70)*	44 *(7)*	55 *(13)*	28.70 *(97.19)*

Department of Agricultural Engineering

Dates of Test: October 31-November 15, 1989

Manufacturer: WHITE NEW IDEA FARM EQUIPMENT CO. 123 West Sycamore Street, Coldwater, Ohio 45828

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W-40 **API service classification** CE, CD-II, SG **To motor** 6.871 gal *(26.009 l)* **Drained from motor** 6.074 gal *(22.994 l)* **Transmission and final drive lubricant** Deutz Allis Power Fluid 821-XL **Total time engine was operated** 34.5 hours

ENGINE: Make Klockner-Humboldt-Deutz Ag Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 7634213 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** (as specified) 4.921" × 5.118" *(125 mm × 130 mm)* **Compression ratio** 15.8 to 1 **Displacement** 584 cu in *(9570 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** two full flow cartridges **Oil cooler** radiator for crankcase oil, separate radiators for transmission and powershift oils **Fuel filter** two paper cartridges **Fuel cooler** radiator for injection pump return fuel **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** air cooled with variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 74.96-80.47 lb/h *(34.0-36.5 kg/h)* **High idle** 2450-2500 rpm **Turbo boost** nominal 12.4-16.0 psi *(85-110 kPa)* as measured 14.8 psi *(102 kPa)*

CHASSIS: Type standard with duals **Serial No.** *9170T-1016* **Tread width** rear 64" *(1626 mm)* to 125" *(3175 mm)* front 65.0" *(1650 mm)* to 85" *(2160 mm)* **Wheel base** 119" *(3023 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center line of rear wheels 37.5" *(953 mm)* Vertical distance above roadway 39.6" *(1006 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.9 *(3.1)* second 2.3 *(3.8)* third 2.5 *(4.0)* fourth 2.8 *(4.5)* fifth 3.1 *(4.9)* sixth 3.6 *(5.8)* seventh 4.1 *(6.6)* eighth 5.0 *(8.1)* ninth 5.4 *(8.7)* tenth 6.0 *(9.6)* eleventh 6.4 *(10.2)* twelfth 6.6 *(10.6)* thirteenth 7.8 *(12.5)* fourteenth 7.8 *(12.6)* fifteenth 9.2 *(14.9)* sixteenth 13.8 *(22.2)* seventeenth 16.8 *(27.0)* eighteenth 19.9 *(32.0)* reverse 2.2 *(3.6)*, 2.7 *(4.4)*, 3.2 *(5.2)*, 4.8 *(7.7)*, 5.9 *(9.4)* 6.9 *(11.1)* **Clutch** dry disc operated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked

LUGGING ABILITY IN 8th (3D) GEAR

Crankshaft Speed rpm	2301	2076	1842	[illegible]	[illegible]	[illegible]
Pull—lbs (kN)	12073 [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]
Increase in Pull %	0	15	24	[illegible]	38	[illegible]
Power—Hp (kW)	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]
Speed—Mph (km/h)	[illegible] [illegible]	4.43 [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]
Slip %	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.41

TRACTOR SOUND LEVEL WITH CAB

	dB(A)
Maximum Available Power—Two Hours	[illegible]
75% of Pull at Maximum Power—Ten Hours	77.0
50% of Pull at Maximum Power—Two Hours	[illegible]
50% of Pull at Reduced Engine Speed—Two Hours	74.0
Bystander in 18th (6C) gear	[illegible]

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 20.8R38; [illegible]	Four 20.8R38; [illegible]
Ballast	—Liquid (each)	874 lb (396 kg)	None
	—Tire Equip (each)	90 lb (41 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two [illegible]	Two [illegible]
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	80 lb (36 kg)	None
Height of Drawbar		22 in (560 mm)	22 in (560 mm)
Static Weight with Operator	—Rear	15865 lb (7196 kg)	[illegible] lb (5448 kg)
	—Front	5615 lb (2547 kg)	[illegible] lb (2474 kg)
	—Total	21480 lb (9743 kg)	17465 lb (7922 kg)

together. **Steering** hydrostatic. **Turning radius** (on concrete surface with brake applied) right 168" (*4.27 m*) left 161" (*4.09 m*) (on concrete surface without brake) right 209" (*5.31 m*) left 198" (*5.03 m*). **Turning space diameter** (on concrete surface with brake applied) right 353" (*8.97 m*) left 339" (*8.61 m*) (on concrete surface without brake) right 436" (*11.07 m*) left 414" (*10.52 m*). **Power take-off** 1000 rpm at 2168 engine rpm. **Unladen tractor mass** 15835 lb (*7183 kg*).

REPAIRS and ADJUSTMENTS: During the 10 hour test the left rear dual wheel came off the axle. The wheel was remounted and the test continued.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 132°F (*56°C*). Eleven gears were chosen between 15% slip and 10 mph (*16.1 km/h*). The cooling air temperature was measured in the airstream of cylinder number 5. The report reflects the test on the tractor equipped with the above hood air inlet.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1634**, February 8, 1990.

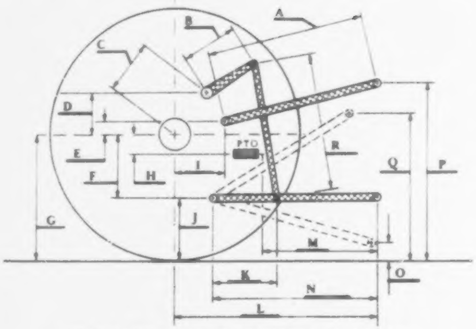
LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (*kPa*)	2250 (15513)
Location	remote outlet
Hydraulic oil temperature °F (°C)	[illegible]
Location	hydraulic suction line

	Maximum Lift Capacity		**with boost cylinder**	
QUICK ATTACH	No		No	
CATEGORY	III		III	
LOAD lbs (*kg*)	[illegible]	(3460)	[illegible]	(3967)
TIME sec	[illegible]		3.42	
HITCH POINT MOVEMENT in (*mm*)				
Lowest position	14.0	(356)	14.0	(356)
Top of timed range	[illegible]	(1026)	[illegible]	(1016)
Highest position	[illegible]	(1026)	[illegible]	(1019)
LOAD CG MOVEMENT in (*mm*)				
Lowest position	14.6	(371)	14.4	(366)
Top of timed range	42.0	(1067)	41.9	(1064)
Highest position	41.9	(1064)	42.1	(1069)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	24.8	*629*
B	16.0	*406*
C	20.1	*511*
D	18.6	*472*
E	10.4	*263*
F	10.2	*260*
G	33.2	*831*
H	1.9	*48*
I	19.9	*506*
J	23.0	*584*
K	22.3	*566*
L	45.3	*1151*
M	23.5	*597*
N	34.8	*884*
O	8.0	*203*
P	45.0	*1143*
Q	35.8	*908*
R	39.3	*997*

Deutz Allis 9170 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1635—DEUTZ ALLIS 9190 DIESEL
18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1062 rpm)								
195.55 *(145.83)*	2300	12.475 *(47.222)*	0.445 *(0.271)*	15.52 *(3.06)*	216 *(102)*	54 *(12)*	75 *(24)*	29.04 *(98.33)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
196.96 *(146.87)*	2167	12.027 *(45.529)*	0.422 *(0.257)*	16.38 *(3.23)*	220 *(104)*	55 *(13)*	77 *(25)*	29.04 *(98.34)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
168.18 *(125.42)*	2352	11.440 *(43.305)*	0.470 *(0.286)*	14.70 *(2.90)*	208 *(98)*	54 *(12)*	77 *(25)*	
	2474	4.389 *(16.615)*			162 *(72)*	55 *(13)*	76 *(24)*	
85.98 *(64.11)*	2408	7.865 *(29.773)*	0.632 *(0.384)*	10.94 *(2.15)*	168 *(75)*	55 *(13)*	77 *(25)*	
191.86 *(143.07)*	2300	12.278 *(46.477)*	0.442 *(0.269)*	15.63 *(3.08)*	204 *(96)*	54 *(12)*	74 *(23)*	
43.74 *(32.62)*	2444	6.221 *(23.551)*	0.983 *(0.598)*	7.03 *(1.39)*	172 *(78)*	55 *(13)*	77 *(25)*	
127.47 *(95.05)*	2378	9.621 *(36.419)*	0.522 *(0.317)*	13.25 *(2.61)*	182 *(83)*	55 *(13)*	80 *(26)*	
Av 102.96 **Av *(76.78)***	**2392**	**8.633** ***(32.688)***	**0.580** ***(0.353)***	**11.92** ***(2.35)***	**182** ***(84)***	**54** ***(12)***	**77** ***(25)***	**29.03** ***(98.31)***

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cool ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (3D) Gear											
170.30 *(127.00)*	13005 *(57.85)*	4.91 *(7.90)*	2300	3.59	12.554 *(47.523)*	0.509 *(0.310)*	13.57 *(2.67)*	171 *(77)*	46 *(8)*	57 *(14)*	28.87 *(97.77)*
75% of Pull at Maximum Power—Ten Hours 8th (3D) Gear											
136.25 *(101.59)*	9905 *(44.06)*	5.16 *(8.30)*	2393	2.75	11.164 *(42.259)*	0.566 *(0.344)*	12.20 *(2.40)*	142 *(61)*	34 *(1)*	38 *(3)*	29.23 *(98.97)*
50% of Pull at Maximum Power—Two Hours 8th (3D) Gear											
92.96 *(69.32)*	6605 *(29.37)*	5.28 *(8.50)*	2429	1.98	9.052 *(34.266)*	0.673 *(0.409)*	10.27 *(2.02)*	134 *(57)*	38 *(3)*	47 *(8)*	29.13 *(98.65)*
50% of Pull at Reduced Engine Speed—Two Hours 14th (5D) Gear											
93.09 *(69.42)*	6603 *(29.37)*	5.29 *(8.51)*	1570	2.03	6.187 *(23.419)*	0.459 *(0.279)*	15.05 *(2.96)*	146 *(63)*	40 *(4)*	48 *(9)*	29.09 *(98.51)*

MAXIMUM PO VER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %				Cool ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
147.97 *(110.34)*	18970 *(84.38)*	2.95 *(4.75)*	2368	8.05		5th (2D) Gear		142 *(61)*	34 *(1)*	40 *(4)*	29.19 *(98.85)*
167.18 *(124.66)*	18550 *(82.51)*	3.42 *(5.50)*	2300	6.73		6th (2O) Gear		149 *(65)*	36 *(2)*	42 *(6)*	29.17 *(98.78)*
169.07 *(126.08)*	15900 *(70.72)*	3.99 *(6.42)*	2301	4.67		7th (3L) Gear		165 *(74)*	44 *(7)*	54 *(12)*	28.91 *(97.90)*
173.17 *(129.13)*	13206 *(58.74)*	4.92 *(7.91)*	2301	3.59		8th (3D) Gear		167 *(75)*	43 *(6)*	53 *(12)*	28.94 *(98.00)*
170.17 *(126.89)*	12078 *(53.73)*	5.28 *(8.50)*	2301	3.18		9th (4L) Gear		167 *(75)*	44 *(7)*	54 *(12)*	28.92 *(97.93)*
168.57 *(125.70)*	10778 *(47.94)*	5.87 *(9.44)*	2300	2.92		10th (3O) Gear		162 *(72)*	44 *(7)*	55 *(13)*	28.90 *(97.87)*
168.93 *(125.98)*	10043 *(44.68)*	6.31 *(10.15)*	2300	2.84		11th (5L) Gear		165 *(74)*	44 *(7)*	55 *(13)*	28.89 *(97.83)*
172.00 *(128.26)*	9950 *(44.26)*	6.48 *(10.43)*	2302	2.67		12th (4D) Gear		165 *(74)*	45 *(7)*	56 *(13)*	28.88 *(97.80)*
167.05 *(124.57)*	8130 *(36.16)*	7.71 *(12.40)*	2299	2.24		13th (4O) Gear		167 *(75)*	45 *(7)*	56 *(13)*	28.88 *(97.80)*
170.07 *(126.82)*	8257 *(36.73)*	7.72 *(12.43)*	2300	2.24		14th (5D) Gear		165 *(74)*	45 *(7)*	57 *(14)*	28.88 *(97.80)*
164.62 *(122.75)*	6712 *(29.86)*	9.20 *(14.80)*	2303	1.72		15th (5O) Gear		165 *(74)*	45 *(7)*	57 *(14)*	28.88 *(97.80)*

Department of Agricultural Engineering

Dates of Test: October 24-November 13, 1989

Manufacturer: WHITE NEW IDEA FARM EQUIPMENT CO. 123 West Sycamore Street, Coldwater, Ohio 45828

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 51.1 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8300 **Fuel weight** 6.910 lbs/gal *(0.828 kg/l)* **Oil SAE** 15W-40 **API service classification** CE, CD-II, SG **To motor** 6.691 gal *(25.330 l)* **Drained from motor** 4.716 gal *(17.851 l)* **Transmission and final drive lubricant** Deutz Allis Power Fluid 821-XL **Front axle lubricant** SAE 90 Gear Lube API GL-5 **Total time engine was operated** 39.5 hours

ENGINE: Make Klockner-Humboldt-Deutz Ag Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 7634237 **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** (as specified) 4.921" × 5.118" *(125 mm × 130 mm)* **Compression ratio** 15.8 to 1 **Displacement** 584 cu in *(9570 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two full flow cartridges **Oil cooler** radiator for crankcase oil, separate radiators for transmission and powershift oils **Fuel filter** two paper cartridges **Fuel cooler** radiator for injection pump return fuel **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** air cooled with variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate 82.67-88.18 lb/h *(37.5-40.0 kg/h)* **High idle** 2450-2500 rpm **Turbo boost** nominal 16-18 psi *(110-124 kPa)* as measured 17.3 psi *(119 kPa)*

CHASSIS: Type front wheel assist with duals **Serial No.** *9190F-1075* **Tread width** rear 64" *(1626 mm)* to 125" *(3175 mm)* front 66.6" *(1690 mm)* to 81.8" *(2080 mm)* **Wheel base** 115" *(2921 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 41.2" *(1046 mm)* Vertical distance above roadway 39.0" *(992 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.9 *(3.1)* second 2.3 *(3.8)* third 2.5 *(4.0)* fourth 2.8 *(4.5)* fifth 3.1 *(4.9)* sixth 3.6 *(5.8)* seventh 4.1 *(6.6)* eighth 5.0 *(8.1)* ninth 5.4 *(8.7)* tenth 6.0 *(9.6)* eleventh 6.4 *(10.2)* twelfth 6.6 *(10.6)* thirteenth 7.8 *(12.5)* fourteenth 7.8 *(12.6)* fifteenth 9.2 *(14.9)* sixteenth 13.8 *(22.2)* seventeenth 16.8 *(27.0)* eighteenth 19.9 *(32.0)* reverse 2.2 *(3.6)*, 2.7 *(4.4)*, 3.2 *(5.2)*, 4.8 *(7.7)*, 5.9 *(9.4)* 6.9 *(11.1)* **Clutch** dry disc operated by foot pedal **Brakes** wet disc hydraulically power actuated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 199" *(5.05 m)* left 197" *(5.00 m)* (on concrete surface without brake) right 306" *(7.77 m)* left 311" *(7.89 m)* **Turning space diameter** (on concrete surface with brake applied) right 433" *(11.00 m)* left 429" *(10.89 m)* (on concrete surface without brake) right 636" *(16.15 m)* left 646" *(16.41 m)* **Power take-off** 1000 rpm at 2168 engine rpm **Unladen tractor mass** 16890 lb *(7661 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 151°F *(66°C)*. Eleven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The pull in 5th (2D) gear was limited to avoid tractor bouncing. The cooling air temperature was measured in the airstream of cylinder number 5. The report reflects the test on the tractor equipped with the above hood air inlet.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1635**, February 8, 1990

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

LUGGING ABILITY IN 8th (3D) GEAR

Crankshaft Speed rpm	2301	2075	1842	1604	1375	1146
Pull—lbs *(kN)*	13206 *(58.74)*	15218 *(67.69)*	16684 *(74.21)*	17617 *(78.36)*	18166 *(80.81)*	17909 *(79.66)*
Increase in Pull %	0	15	26	33	38	36
Power—Hp *(kW)*	173.17 *(129.13)*	178.60 *(133.18)*	172.30 *(128.48)*	157.07 *(117.12)*	137.80 *(102.76)*	113.58 *(84.70)*
Speed—Mph *(km/h)*	4.92 *(7.91)*	4.40 *(7.08)*	3.87 *(6.23)*	3.34 *(5.38)*	2.84 *(4.58)*	2.38 *(3.83)*
Slip %	3.59	4.42	4.91	5.87	6.82	6.55

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	75.5
75% of Pull at Maximum Power—Ten Hours	76.5
50% of Pull at Maximum Power—Two Hours	75.5
50% of Pull at Reduced Engine Speed—Two Hours	73.0
Bystander in 18th (6O) gear	88.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8R38; * 12 *(83)*	Four 20.8R38; * 12 *(83)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	60 lb *(27 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 18.4R26; ** 16 *(110)*	Two 18.4R26; ** 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	105 lb *(48 kg)*	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*
Static Weight with Operator	—Rear	12270 lb *(5565 kg)*	12030 lb *(5457 kg)*
	—Front	6880 lb *(3121 kg)*	6670 lb *(3025 kg)*
	—Total	19150 lb *(8686 kg)*	18700 lb *(8482 kg)*

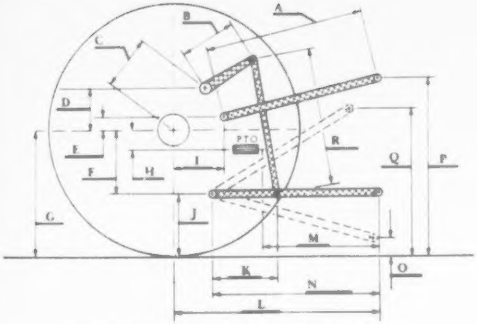
THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	[illegible]
Location	[illegible]
Hydraulic oil temperature °F (°C)	[illegible]
Location	[illegible]

	Maximum Lift Capacity			
QUICK ATTACH	[illegible]		[illegible]	
CATEGORY	III		III	
LOAD lbs (kN)	[illegible]	[illegible]	[illegible]	[illegible]
TIME sec	[illegible]		[illegible]	
HITCH POINT MOVEMENT [illegible]				
Lowest position	[illegible]	[illegible]	[illegible]	[illegible]
Top of control range	*[illegible]	[illegible]	[illegible]	[illegible]
Highest position	**[illegible]	[illegible]	[illegible]	[illegible]
LOAD CG MOVEMENT [illegible]				
Lowest position	[illegible]	[illegible]	[illegible]	[illegible]
Top of control range	[illegible]	[illegible]	[illegible]	[illegible]
Highest position	[illegible]	[illegible]	[illegible]	[illegible]

*The observed power range [illegible] specified in ASAE Standard S217 [illegible]

**The observed highest position [illegible] than the minimum height for highest position for Cat III [illegible] specified in ASAE Standard S217.10.



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	25.0	635
B	16.0	406
C	20.1	511
D	18.6	472
E	10.4	263
F	10.2	260
G	32.6	828
H	1.9	48
I	19.9	506
J	22.4	568
K	22.3	566
L	45.3	1151
L'	49.9	1268
M	23.5	597
N	34.8	884
O	8.0	203
P	44.4	1128
Q	35.8	908
R	39.0	991

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Deutz Allis 9190 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1636—WHITE 60 DIESEL
18 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed — Two hours (PTO Speed — 880 rpm)									
	61.07 (45.54)	2200	4.188 (15.854)	0.479 (0.292)	14.58 (2.87)	185 (85)	51 (11)	76 (24)	29.15 (98.70)
Standard Power Take-off Speed (540 rpm) — One Hour									
	61.61 (45.94)	2160	4.162 (15.757)	0.472 (0.287)	14.80 (2.92)	183 (84)	48 (9)	72 (22)	29.16 (98.75)
VARYING POWER AND FUEL CONSUMPTION — Two Hours									
	53.25 (39.71)	2256	3.600 (13.629)	0.473 (0.288)	14.79 (2.91)	183 (84)	49 (9)	74 (23)	......
	......	2378	1.511 (5.718)	......	......	175 (79)	49 (9)	73 (23)	......
	27.39 (20.42)	2322	2.450 (9.275)	0.625 (0.380)	11.18 (2.20)	179 (82)	49 (9)	74 (23)	......
	62.07 (46.28)	2200	4.214 (15.952)	0.475 (0.289)	14.73 (2.90)	184 (84)	50 (10)	74 (23)	......
	13.85 (10.33)	2347	1.953 (7.391)	0.985 (0.599)	7.10 (1.40)	177 (81)	52 (11)	76 (24)	......
	40.55 (30.23)	2289	2.978 (11.273)	0.514 (0.312)	13.61 (2.68)	177 (80)	52 (11)	76 (24)	......
Av Av	**32.95** **(24.57)**	**2299**	**2.784** **(10.540)**	**0.591** **(0.359)**	**11.83** **(2.33)**	**179** **(82)**	**50** **(10)**	**74** **(24)**	**29.13** **(98.65)**

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two Hours 8th (3B) Gear											
51.31 (38.26)	4459 (19.83)	4.32 (6.94)	2199	3.85	4.112 (15.567)	0.560 (0.341)	12.48 (2.46)	186 (86)	63 (17)	74 (23)	28.60 (96.85)
75% of Pull at Maximum Power — Ten Hours 8th (3B) Gear											
41.75 (31.13)	3465 (15.41)	4.52 (7.27)	2280	2.71	3.499 (13.244)	0.586 (0.356)	11.93 (2.35)	185 (85)	32 (0)	39 (4)	29.29 (99.19)
50% of Pull at Maximum Power — Two Hours 8th (3B) Gear											
28.50 (21.25)	2310 (10.28)	4.63 (7.45)	2311	1.90	2.897 (10.965)	0.711 (0.432)	9.84 (1.94)	186 (85)	40 (4)	47 (8)	29.14 (98.66)
50% of Pull at Reduced Engine Speed — Two Hours 12th (4C) Gear											
28.49 (21.24)	2310 (10.28)	4.62 (7.44)	1487	1.81	2.274 (8.609)	0.558 (0.339)	12.53 (2.47)	177 (81)	42 (6)	52 (11)	29.14 (98.68)

Department of Biological Systems Engineering

Dates of Test: April 5-27, 1990

Manufacturer: WHITE NEW IDEA FARM EQUIPMENT Co., 123 West Sycamore Street, Coldwater, Ohio 45828

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8396 **Fuel weight** 6.991 lbs/gal *(0.838 kg/l)* **Oil SAE** 15W40 **API service classification** CE, CD-II, SG **To motor** 2.234 gal *(8.458 l)* **Drained from motor** 1.747 gal *(6.614 l)* **Transmission and powershift lubricant** White Universal Fluid **Front axle lubricant** SAE 80-90 M.P. Gear Lubricant API GL-5 **Total time engine was operated** 39.0 hours.

ENGINE: Make Consolidated Diesel Corporation-Cummins Diesel **Type** four cylinder vertical **Serial No.** 44535570B **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** (as specified) 4.02" × 4.72" *(102 mm × 120 mm)* **Compression ratio** 17.0 to 1 **Displacement** 239 cu in *(3900 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, separate radiators for hydraulic and powershift oils **Fuel filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate 28.9-30.1 lb/h *(13.1-13.6 kg/h)* **High idle** 2325-2425 rpm.

CHASSIS: Type front wheel assist **Serial No.** *403034-60F* **Tread width** rear 60" *(1524 mm)* to 81.3" *(2064 mm)* front 60.5" *(1540 mm)* to 66.5" *(1690 mm)* **Wheel base** 95" *(2413 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 35.6" *(904 mm)* Vertical distance above roadway 27.6" *(701 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) speed operator controlled powershift **Advertised speeds mph (km/h)** first 2.1 *(3.4)* second 2.5 *(4.1)* third 2.7 *(4.4)* fourth 3.0 *(4.9)* fifth 3.3 *(5.3)* sixth 3.6 *(5.8)* seventh 3.9 *(6.3)* eighth 4.4 *(7.0)* ninth 4.7 *(7.5)* tenth 5.2 *(8.4)* eleventh 5.6 *(9.1)* twelfth 6.8 *(10.9)* thirteenth 9.7 *(15.7)* fourteenth 11.7 *(18.9)* fifteenth 14.1 *(22.6)* sixteenth 16.7 *(26.9)* seventeenth 20.2 *(32.4)* eighteenth 24.2 *(38.9)* reverse 2.2 *(3.5)*, 2.6 *(4.2)*, 3.1 *(5.0)*, 3.7 *(6.0)*, 4.4 *(7.1)*, 5.3 *(8.6)* **Clutch** single dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on

MAXIMUM POWER IN SELECTED GEARS

46.23 (34.47)	7762 (34.53)	2.23 (3.59)	2211	14.82	2nd (1B) Gear	185 (85)	62 (17)	68 (20)	28.59 (96.82)
49.21 (36.69)	7172 (31.90)	2.57 (4.14)	2201	8.38	3rd (2A) Gear	185 (85)	62 (17)	74 (23)	28.73 (97.29)
51.38 (38.31)	6556 (29.16)	2.94 (4.73)	2198	6.15	4th (1C) Gear	185 (84)	61 (16)	66 (19)	28.70 (97.19)
52.33 (39.03)	6170 (27.44)	3.18 (5.12)	2196	5.65	5th (2B) Gear	184 (84)	60 (16)	68 (20)	28.72 (97.26)
50.68 (37.79)	5348 (23.79)	3.55 (5.72)	2200	4.55	6th (3A) Gear	186 (86)	62 (17)	73 (23)	28.73 (97.29)
52.39 (39.07)	5065 (22.53)	3.88 (6.24)	2199	4.26	7th (2C) Gear	185 (85)	62 (17)	73 (23)	28.73 (97.29)
51.99 (38.77)	4507 (20.05)	4.33 (6.97)	2200	3.66	8th (3B) Gear	185 (85)	61 (16)	70 (21)	28.72 (97.26)
50.55 (37.70)	4060 (18.06)	4.67 (7.52)	2201	3.36	9th (4A) Gear	185 (85)	62 (17)	73 (23)	28.73 (97.29)
51.92 (38.72)	3730 (16.59)	5.22 (8.40)	2200	3.06	10th (5C) Gear	185 (85)	61 (16)	71 (22)	28.72 (97.26)
52.07 (38.83)	3451 (15.35)	5.66 (9.11)	2202	2.75	11th (4B) Gear	185 (85)	62 (17)	72 (22)	28.72 (97.26)
50.87 (37.93)	2800 (12.45)	6.81 (10.96)	2199	2.21	12th (4C) Gear	185 (85)	62 (17)	73 (23)	28.73 (97.29)
45.78 (34.14)	1731 (7.70)	9.92 (15.96)	2202	1.28	15th (5A) Gear	186 (86)	62 (17)	73 (23)	28.73 (97.29)

LUGGING ABILITY IN 8th (3B) GEAR

Crankshaft Speed rpm	2200	1960	1761	1540	1319	1105	871
Pull—lbs (kN)	4507 (20.05)	4848 (21.56)	5136 (22.85)	5267 (23.43)	5303 (23.59)	5367 (23.87)	5221 (23.22)
Increase in Pull %	0	8	14	17	18	19	16
Power—Hp (kW)	51.99 (38.77)	50.16 (37.40)	47.07 (35.10)	42.14 (31.42)	36.32 (27.08)	30.69 (22.89)	23.62 (17.62)
Speed—Mph (km/h)	4.33 (6.97)	3.88 (6.24)	3.44 (5.53)	3.00 (4.83)	2.57 (4.13)	2.14 (3.45)	1.70 (2.73)
Slip %	3.66	4.04	4.48	4.63	4.65	4.78	4.63

	Front Wheel Drive	
TRACTOR SOUND LEVEL WITH OUT CAB	Disengaged dB(A)	Engaged dB(A)
Maximum Available Power—Two Hours	97.0	96.5
75% of Pull at Maximum Power—Ten Hours		97.0
50% of Pull at Maximum Power—Two Hours		95.5
50% of Pull at Reduced Engine Speed—Two Hours		92.0
Bystander in 16th (6A) gear	91.0	

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Temp °F (°C) Air wet bulb	Temp °F (°C) Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two hours 8th (3B) Gear											
51.25 (38.22)	4515 (20.08)	4.26 (6.85)	2200	3.32	4.105 (15.540)	0.560 (0.341)	12.48 (2.46)	186 (86)	61 (16)	73 (23)	28.74 (97.33)

MAXIMUM POWER IN SELECTED GEARS

45.17 (33.68)	6209 (27.62)	2.73 (4.39)	2226	14.01	4th (1C) Gear	184 (84)	60 (16)	64 (18)	28.62 (96.92)
51.74 (38.59)	5090 (22.64)	3.81 (6.13)	2199	3.89	7th (2C) Gear	186 (85)	62 (17)	74 (23)	28.73 (97.29)
51.85 (38.67)	4555 (20.25)	4.27 (6.87)	2200	4.88	8th (3B) Gear	185 (85)	61 (16)	70 (21)	28.72 (97.26)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 18.4R34; *; 16 (110)	Two 18.4R34; *; 16 (110)
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	132 lb (60 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 13.6-24; 8; 14 (95)	Two 13.6-24; 8; 14 (95)
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	25 lb (11 kg)	None
Height of Drawbar		19.5 in (495 mm)	19.5 in (495 mm)
Static Weight with Operator	—Rear	5665 lb (2570 kg)	5400 lb (2450 kg)
	—Front	3190 lb (1447 kg)	3140 lb (1424 kg)
	—Total	8855 lb (4017 kg)	8540 lb (3874 kg)

concrete surface with brake applied) right 147" (3.73 m) left 146" (3.71 m)(on concrete surface without brake) right 162" (4.11 m) left 162" (4.11 m) **Turning space diameter** (on concrete surface with brake applied) right 301" (7.64 m) left 298" (7.57 m)(on concrete surface without brake) right 330" (8.38 m) left 331" (8.41 m) **Power take-off** 540 rpm at 2160 engine rpm and 1000 rpm at 2217 engine rpm **Unladen tractor mass** 8540 lb (3783 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump was maintained at 142 °F (61°C). Twelve gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1656**, July, 30, 1990

LOUIS I. LEVITICUS
Engineer-in-Charge

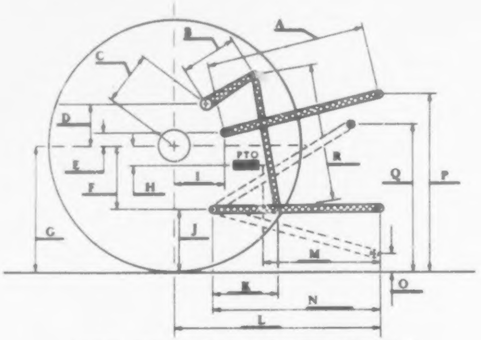
K. VON BARGEN
R.D. GRISSO
G.J. HOFFMAN
Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2275	(15690)
Location	remote outlet	
Hydraulic oil temperature °F (°C)	144	(62)
Location	pump inlet	
	Maximum Lift Capacity	
QUICK ATTACH	No	
CATEGORY	II	
LOAD lbs (kg)	**4150	(1873)
TIME sec	2.56	
HITCH POINT MOVEMENT in (mm)		
Lowest position	14.3	(363)
Top of timed range	*35.8	(909)
Highest position	36.9	(937)
LOAD CG MOVEMENT in (mm)		
Lowest position	15.0	(381)
Top of timed range	34.7	(881)
Highest position	35.3	(895)

* The observed power range 21.5" (546 mm) does not meet the minimum power range 24.0" (610 mm) as specified by ASAE Standard S217.10

** Manufacturers advertised capacity was 4500 lb (2041 kg)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	27.5	699
B	13.2	336
C	13.0	330
D	12.6	320
E	11.6	294
F	9.8	248
G	30.2	766
H	2.2	55
I	8.9	227
J	20.4	518
K	20.0	508
L	39.8	1010
M	19.4	493
N	32.5	826
O	8.0	203
P	39.4	1001
Q	31.9	810
R	32.8	833

White 60 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell W. Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1637—WHITE 80 DIESEL
18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 984 rpm)								
81.48 (60.76)	2200	4.841 (18.326)	0.415 (0.253)	16.83 (3.32)	188 (87)	57 (14)	76 (24)	28.92 (97.92)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
71.87 (53.60)	2282	4.484 (16.975)	0.436 (0.265)	16.03 (3.16)	185 (85)	57 (14)	76 (24)	
	2400	1.652 (6.254)			185 (85)	56 (13)	76 (24)	
36.67 (27.34)	2332	2.914 (11.030)	0.556 (0.338)	12.58 (2.48)	180 (82)	56 (13)	76 (24)	
82.06 (61.19)	2199	4.845 (18.340)	0.413 (0.251)	16.94 (3.34)	188 (86)	57 (14)	77 (25)	
18.58 (13.86)	2359	2.287 (8.658)	0.861 (0.523)	8.12 (1.60)	178 (81)	57 (14)	77 (25)	
54.28 (40.48)	2300	3.648 (13.807)	0.470 (0.286)	14.88 (2.93)	183 (84)	56 (13)	76 (24)	
Av 44.20 **Av (32.96)**	**2312**	**3.305** **(12.511)**	**0.523** **(0.318)**	**13.57** **(2.65)**	**183** **(84)**	**56** **(13)**	**76** **(24)**	**28.88** **(97.81)**

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 7th (3B) Gear											
68.16 (50.82)	5840 (25.98)	4.38 (7.04)	2199	4.61	4.856 (18.383)	0.498 (0.303)	14.04 (2.77)	195 (91)	65 (18)	81 (27)	28.60 (96.85)
75% of Pull at Maximum Power — Ten Hours 7th (3B) Gear											
55.91 (41.69)	4526 (20.13)	4.63 (7.46)	2297	3.36	4.253 (16.098)	0.532 (0.324)	13.15 (2.59)	185 (85)	51 (10)	55 (13)	28.75 (97.36)
50% of Pull at Maximum Power — Two Hours 7th (3B) Gear											
37.93 (28.28)	3018 (13.42)	4.71 (7.58)	2318	2.58	3.419 (12.941)	0.630 (0.383)	11.09 (2.19)	185 (85)	38 (3)	40 (4)	29.05 (98.36)
50% of Pull at Reduced Engine Speed — Two Hours 12th (5A) Gear											
37.90 (28.27)	3018 (13.42)	4.71 (7.58)	1499	2.54	2.725 (10.315)	0.505 (0.308)	13.91 (2.74)	179 (81)	39 (4)	40 (4)	28.92 (97.93)
MAXIMUM POWER IN SELECTED GEARS											
64.18 (47.86)	10091 (44.89)	2.38 (3.84)	2209	14.25	2nd (1B) Gear			188 (87)	34 (1)	40 (4)	29.15 (98.71)
66.63 (49.69)	8315 (36.99)	3.00 (4.84)	2198	7.04	3rd (1C) Gear			185 (85)	60 (16)	68 (20)	28.60 (96.85)
66.82 (49.83)	8004 (35.60)	3.13 (5.04)	2198	6.69	4th (2A) Gear			185 (85)	60 (16)	68 (20)	28.62 (96.92)
69.44 (51.78)	7233 (32.17)	3.60 (5.79)	2199	5.34	5th (3A) Gear			182 (83)	36 (2)	47 (8)	29.11 (98.58)
71.01 (52.95)	6946 (30.90)	3.83 (6.17)	2199	5.19	6th (2B) Gear			185 (85)	36 (2)	47 (8)	29.11 (98.58)
70.74 (52.75)	6035 (26.84)	4.40 (7.08)	2200	4.24	7th (3B) Gear			189 (87)	36 (2)	48 (9)	29.10 (98.54)
69.77 (52.03)	5620 (25.00)	4.66 (7.49)	2199	3.94	8th (2C) Gear			187 (86)	36 (2)	48 (9)	29.10 (98.54)
69.92 (52.14)	4933 (21.94)	5.32 (8.55)	2200	3.34	9th (3C) Gear			185 (85)	37 (3)	49 (9)	29.09 (98.51)
70.04 (52.23)	4757 (21.16)	5.52 (8.89)	2198	3.19	10th (4A) Gear			182 (83)	35 (2)	46 (8)	29.12 (98.61)
70.18 (52.34)	3932 (17.49)	6.69 (10.77)	2198	2.58	11th (4B) Gear			188 (87)	35 (2)	46 (8)	29.12 (98.61)
68.09 (50.77)	3692 (16.42)	6.92 (11.13)	2201	2.51	12th (5A) Gear			182 (83)	35 (2)	46 (8)	29.12 (98.61)
67.67 (50.46)	3144 (13.99)	8.07 (12.99)	2200	1.97	13th (4C) Gear			184 (85)	36 (2)	47 (8)	29.11 (98.58)

Department of Biological Systems Engineering

Dates of Test: April 3-26, 1990

Manufacturer: WHITE NEW IDEA FARM EQUIPMENT Co., 123 West Sycamore Street, Coldwater, Ohio 45828

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8396 **Fuel weight** 6.991 lbs/gal *(0.838 kg/l)* **Oil SAE** 15W40 **API service classification** CE, CD-II, SG **To motor** 2.398 gal *(9.078 l)* **Drained from motor** 2.140 gal *(8.102 l)* **Transmission and powershift lubricant** White Universal Fluid **Front axle lubricant** SAE 80-90 M.P. Gear Lubricant API GL-5 **Total time engine was operated** 43.5 hours

ENGINE: Make Consolidated Diesel Corporation-Cummins Diesel **Type** four cylinder vertical with turbocharger **Serial No.** 44317342B **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** (as specified) 4.02" × 4.72" *(102 mm × 120 mm)* **Compression ratio** 17.5 to 1 **Displacement** 239 cu in *(3900 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, separate radiators for transmission and powershift oils **Fuel filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate 33.3-34.7 lb/h *(15.1-15.7 kg/h)* **High idle** 2325-2425 rpm **Turbo boost** nominal 8.0-10.0 psi *(55-69 kPa)* **as measured** 9.0 psi *(62 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *402660-80F* **Tread width** rear 61" *(1549 mm)* to 89.5" *(2273 mm)* front 60.5" *(1540 mm)* to 66.5" *(1690 mm)* **Wheel base** 95" *(2413 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.3" *(820 mm)* Vertical distance above roadway 28.0" *(710 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.1 *(3.3)* second 2.6 *(4.2)* third 3.1 *(5.0)* fourth 3.3 *(5.2)* fifth 3.7 *(5.9)* sixth 3.9 *(6.2)* seventh 4.4 *(7.1)* eighth 4.6 *(7.5)* ninth 5.3 *(8.5)* tenth 5.5 *(8.8)* eleventh 6.6 *(10.6)* twelfth 6.8 *(10.9)* thirteenth 7.9 *(12.7)* fourteenth 8.2 *(13.2)* fifteenth 9.8 *(15.8)* sixteenth 11.6 *(18.6)* seventeenth 13.9 *(22.4)* eighteenth 16.7 *(26.8)* reverse 2.5 *(4.0)*, 3.0 *(4.8)*, 3.6 *(5.8)*, 4.2 *(6.8)*, 5.1 *(8.2)*, 6.1 *(9.8)* **Clutch** single dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 147" *(3.73 m)* left 146" *(3.71 m)*(on concrete surface without brake) right 162" *(4.11 m)* left 162" *(4.11 m)* **Turning space diameter** (on concrete surface with brake applied) right 301" *(7.64 m)* left 298" *(7.57 m)*(on concrete surface without brake) right 330" *(8.38 m)* left 331" *(8.41 m)* **Power take-off** 540 rpm at 2160 engine rpm and 1000 rpm at 2217 engine rpm **Unladen tractor mass** 9170 lb *(4159 kg)*

LUGGING ABILITY IN 7th (3B) GEAR

Crankshaft Speed rpm	2200	1978	1768	1549	1309	1098
Pull—lbs (kN)	6035 (26.84)	6694 (29.78)	7212 (32.08)	7478 (33.26)	7484 (33.29)	7280 (32.38)
Increase in Pull %	0	11	20	24	24	21
Power—Hp (kW)	70.74 (52.75)	70.10 (52.27)	67.08 (50.02)	60.76 (45.30)	51.35 (38.29)	41.97 (31.30)
Speed—Mph (km/h)	4.40 (7.08)	3.93 (6.32)	3.49 (5.61)	3.05 (4.90)	2.57 (4.14)	2.16 (3.48)
Slip %	4.24	4.68	5.26	5.84	5.84	5.55

TRACTOR SOUND LEVEL WITH OUT CAB	Front Wheel Drive Disengaged dB(A)	Front Wheel Drive Engaged dB(A)
Maximum Available Power—Two Hours	94.0	94.0
75% of Pull at Maximum Power—Ten Hours		94.0
50% of Pull at Maximum Power—Two Hours		93.0
50% of Pull at Reduced Engine Speed—Two Hours		88.0
Bystander in 18th (6C) gear	85.5	

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two hours 7th (3B) Gear											
65.27 (48.67)	5675 (25.25)	4.31 (6.94)	2199	6.09	4.742 (17.950)	0.508 (0.309)	13.76 (2.71)	188 (87)	63 (17)	75 (24)	28.62 (96.92)
MAXIMUM POWER IN SELECTED GEARS											
61.41 (45.80)	7725 (34.35)	2.98 (4.80)	2267	13.95	4th (2A) Gear			181 (83)	35 (2)	42 (6)	29.14 (98.68)
69.52 (51.84)	6964 (30.98)	3.74 (6.02)	2200	7.57	6th (2B) Gear			185 (85)	35 (2)	43 (6)	29.14 (98.68)
69.48 (51.81)	6028 (26.82)	4.32 (6.95)	2199	5.95	7th (3B) Gear			186 (86)	36 (2)	48 (9)	29.09 (98.51)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4R34; * 16 *(110)*	Two 18.4R34; * 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	390 lb *(177 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 13.6-24; 8; 14 *(95)*	Two 13.6-24; 8; 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	605 lb *(274 kg)*	None
Height of Drawbar		19.0 in *(485 mm)*	19.0 in *(485 mm)*
Static Weight with Operator	—Rear	7015 lb *(3182 kg)*	6235 lb *(2828 kg)*
	—Front	4325 lb *(1962 kg)*	3115 lb *(1413 kg)*
	—Total	11340 lb *(5144 kg)*	9350 lb *(4241 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kPa)*	*2400	*(16550)*
Location	remote outlet	
Hydraulic oil temperature °F *(°C)*	162	*(72)*
Location	pump inlet	
	Maximum Lift Capacity	
QUICK ATTACH	No	
CATEGORY	II	
LOAD lbs *(kg)*	5020	*(2277)*
TIME sec	5.02	
HITCH POINT MOVEMENT in *(mm)*		
Lowest position	13.6	*(345)*
Top of timed range	**36.0	*(914)*
Highest position	36.0	*(914)*
LOAD CG MOVEMENT in *(mm)*		
Lowest position	14.8	*(376)*
Top of timed range	35.1	*(892)*
Highest position	35.1	*(892)*

* The observed system pressure, 2400 psi *(16550 kPa)* exceeds manufacturers maximum pressure of 2275 psi *(15685 kPa)*

** The observed power range 22.4" *(569 mm)* does not meet the minimum power range 24.0" *(610 mm)* as specified by ASAE Standard S217.10

REPAIRS AND ADJUSTMENTS: The right brake return spring was found broken following the drawbar tests.

REMARKS: All test results were determined from observed data obtained in accordance with official SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump was maintained at 160 °F *(71°C)*. Twelve gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1637**, July, 30, 1990.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R.D. GRISSO
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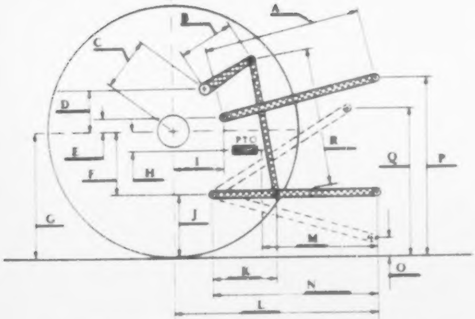
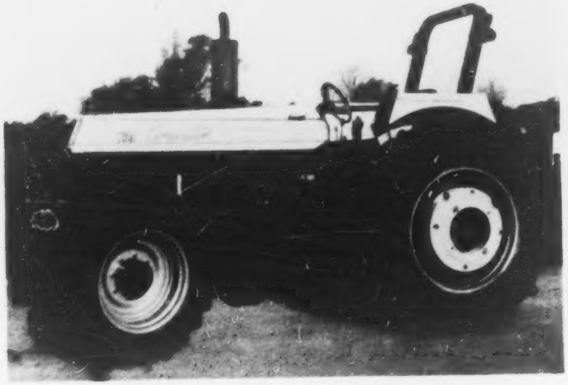
Board of Tractor Test Engineers



	inch	mm
A	27.9	708
B	13.2	336
C	13.0	330
D	12.6	320
E	11.6	294
F	9.8	248
G	29.9	759
H	2.2	55
I	8.9	227
J	20.1	511
K	20.0	508
L	39.8	1010
M	20.1	511
N	32.5	826
O	8.0	203
P	39.1	993
Q	31.4	797
R	32.1	816

HITCH DIMENSIONS AS TESTED—NO LOAD



White 80 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell W. Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1638—BELARUS 420A DIESEL (ALSO BELARUS 400A DIESEL) 11 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 540 rpm)								
50.68 (37.79)	1800	3.110 (11.772)	0.429 (0.261)	16.30 (3.21)	185 (85)	62 (17)	74 (24)	28.85 (97.63)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
44.10 (32.88)	1843	2.725 (10.315)	0.432 (0.263)	16.18 (3.19)	177 (81)	62 (17)	75 (24)	
	1898	1.038 (3.93)			145 (63)	62 (17)	74 (23)	
22.41 (16.71)	1872	1.592 (6.027)	0.497 (0.302)	14.08 (2.77)	151 (66)	62 (17)	75 (24)	
51.15 (38.14)	1800	3.098 (11.728)	0.425 (0.258)	16.51 (3.25)	178 (81)	62 (17)	75 (24)	
11.28 (8.41)	1888	1.395 (5.279)	0.864 (0.526)	8.09 (1.59)	152 (67)	62 (17)	75 (24)	
33.37 (24.88)	1860	2.111 (7.992)	0.442 (0.269)	15.80 (3.11)	158 (70)	62 (17)	75 (24)	
Av 27.15 **Av (20.25)**	**1860**	**1.993** **(7.545)**	**0.513** **(0.312)**	**13.62** **(2.68)**	**160** **(71)**	**62** **(17)**	**75** **(24)**	**28.85** **(97.64)**

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 6th (1) Gear											
43.73 (32.61)	4303 (19.14)	3.81 (6.13)	1798	5.20	3.111 (11.777)	0.497 (0.303)	14.06 (2.77)	196 (91)	60 (15)	73 (23)	28.83 (97.63)
75% of Pull at Maximum Power — Ten Hours 6th (1) Gear											
34.92 (26.04)	3299 (14.67)	3.97 (6.39)	1845	3.76	2.575 (9.746)	0.515 (0.314)	13.56 (2.67)	165 (74)	51 (10)	65 (18)	29.00 (98.20)
50% of Pull at Maximum Power — Two Hours 6th (1) Gear											
23.75 (17.71)	2200 (9.79)	4.05 (6.52)	1864	2.92	2.017 (7.635)	0.594 (0.361)	11.77 (2.32)	146 (63)	53 (12)	60 (16)	28.78 (97.44)
50% of Pull at Reduced Engine Speed — Two Hours 8th (3) Gear											
23.78 (17.74)	2199 (9.78)	4.06 (6.53)	1212	2.88	1.674 (6.335)	0.492 (0.299)	14.21 (2.80)	185 (85)	64 (18)	79 (26)	28.77 (97.43)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank shaft speed rpm	Slip %	Gear	Cool ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
37.66 (28.09)	7435 (33.07)	1.90 (3.06)	1828	14.57	3rd (2R) Gear	164 (73)	55 (13)	64 (18)	28.85 (97.70)
12.31 (9.18)	2018 (8.98)	2.29 (3.68)	1877	2.67	4th (3R) Gear	148 (64)	57 (14)	67 (19)	28.85 (97.70)
14.32 (10.68)	2012 (8.95)	2.67 (4.30)	1874	2.67	5th (4R) Gear	147 (64)	58 (14)	69 (21)	28.84 (97.66)
44.91 (33.49)	4399 (19.57)	3.83 (6.16)	1800	4.79	6th (1) Gear	172 (78)	53 (12)	61 (16)	28.75 (97.36)
44.51 (33.19)	3288 (14.62)	5.08 (8.17)	1801	3.46	7th (2) Gear	169 (76)	53 (12)	61 (16)	28.74 (97.33)
43.71 (32.60)	2729 (12.14)	6.01 (9.67)	1800	3.05	8th (3) Gear	171 (77)	52 (11)	60 (16)	28.75 (97.29)
43.31 (32.30)	2306 (10.26)	7.05 (11.34)	1798	2.52	9th (4) Gear	170 (76)	51 (11)	59 (15)	28.72 (97.26)

Department of Biological Systems Engineering

Dates of Test: May 11-21, 1990

Manufacturer: LIPETSK TRACTOR PLANT Lipetsk, USSR

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 55.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8396 **Fuel weight** 6.991 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 2.427 gal *(9.188 l)* **Drained from motor** 1.974 gal *(7.472 l)* **Transmission and final drive lubricant** SAE 90 Gear Lube **Hydraulic lubricant** SAE 30 **Total time engine was operated** 41.5 hours

ENGINE: Make Belarus Diesel **Model** D144-28 **Type** four cylinder vertical **Serial No.** 2595507 **Crankshaft** lengthwise **Rated rpm** 1800 **Bore and stroke** (as specified) 4.134" × 4.724" *(105 mm × 120 mm)* **Compression ratio** 16.5 to 1 **Displacement** 254 cu in *(4150 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** oil bath and precleaner **Oil filter** full flow centrifugal **Oil cooler** radiator for crankcase oil **Fuel filter** one cleanable screen and one paper element **Muffler** vertical **Cooling medium temperature control** air cooled

ENGINE OPERATING PARAMETERS: Fuel rate maximum 22.7 lb/h *(10.3 kg/h)* **High idle** not to exceed 1950 rpm

CHASSIS: Type front wheel assist **Serial No.** 441662 **Tread width** rear 54.1" *(1375 mm)* to 72.4" *(1840 mm)* front 53.1" *(1350 mm)* to 71.1" *(1805 mm)* **Wheel base** 88.6" *(2250 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.5" *(800 mm)* Vertical distance above roadway 33.1" *(840 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive with throwout lever (engaged during test) **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.5 *(2.3)* second 1.9 *(3.1)* third 2.2 *(3.5)* fourth 2.3 *(3.6)* fifth 2.6 *(4.2)* sixth 4.0 *(6.4)* seventh 5.3 *(8.4)* eighth 6.2 *(9.9)* ninth 7.2 *(11.6)* tenth 10.9 *(17.5)* eleventh 15.4 *(24.8)* reverse 0.8 *(1.3)*, 2.2 *(3.5)*, 4.0 *(6.4)*, 5.3 *(8.4)*, 6.2 *(9.9)*, 7.2 *(11.6)*, 10.9 *(17.5)*, 15.4 *(24.8)* **Clutch** single dry disc operated by foot pedal **Brakes** dry band operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 173" *(4.39 m)* left 167" *(4.24 m)* (on concrete surface without brake) right 211" *(5.36 m)* left 198" *(5.03 m)* **Turning space diameter** (on concrete surface

LUGGING ABILITY IN 6th (1) GEAR

Crankshaft Speed rpm	1800	1621	1455	1258	1072	899
Pull—lbs (kN)	4399 *(19.57)*	4695 *(20.88)*	5134 *(22.84)*	5195 *(23.11)*	5170 *(23.00)*	5019 *(22.33)*
Increase in Pull %	0	7	17	18	18	14
Power—Hp (kW)	44.90 *(33.48)*	42.94 *(32.02)*	41.24 *(30.75)*	36.57 *(27.27)*	31.05 *(23.15)*	25.31 *(18.87)*
Speed—Mph (km/h)	3.83 *(6.16)*	3.43 *(5.52)*	3.01 *(4.85)*	2.64 *(4.25)*	2.25 *(3.62)*	1.89 *(3.04)*
Slip %	4.79	5.34	5.88	6.02	6.02	5.75

	Front Wheel Drive Disengaged dB(A)	Engaged dB(A)
TRACTOR SOUND LEVEL WITH OUT CAB		
Maximum Available Power—Two Hours	96.0	98.0
75% of Pull at Maximum Power—Ten Hours		97.5
50% of Pull at Maximum Power—Two Hours		96.5
50% of Pull at Reduced Engine Speed—Two Hours		93.0
Bystander in 11th (6) gear		88.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power — Two hours 6th (1) Gear											
44.25 *(32.99)*	4345 *(19.33)*	3.82 *(6.15)*	1798	5.01	3.104 *(11.750)*	0.490 *(0.298)*	14.26 *(2.81)*	174 *(79)*	53 *(12)*	61 *(16)*	28.78 *(97.44)*
MAXIMUM POWER IN SELECTED GEARS											
32.48 *(24.22)*	6521 *(29.01)*	1.99 *(3.20)*	1041	13.75	3rd (RR) Gear			157 *(69)*	53 *(12)*	61 *(16)*	28.86 *(97.73)*
44.95 *(33.50)*	4413 *(19.63)*	3.82 *(6.14)*	1798	5.01	6th (1) Gear			179 *(81)*	52 *(11)*	60 *(16)*	28.78 *(97.46)*

OPTIONAL TESTS
(Hydraulic pump disengaged)

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two Hours (PTO speed — 540 rpm)								
52.67 *(39.28)*	1800	3.148 *(11.916)*	0.418 *(0.254)*	16.73 *(3.30)*	187 *(86)*	61 *(16)*	75 *(24)*	28.83 *(97.62)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 15.5R38; 6; 18 (125)	Two 15.5R38; 6; 18 (125)
Ballast	—Liquid (each)	570 lb (259 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 8.5-20; 8; 35 (240)	Two 8.5-20; 8; 35 (240)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	None	None
Height of Drawbar		15.5 in (395 mm)	15.5 in (395 mm)
Static Weight with Operator	—Rear	5840 lb (2649 kg)	4700 lb (2132 kg)
	—Front	2825 lb (1281 kg)	2825 lb (1281 kg)
	—Total	8665 lb (3930 kg)	7525 lb (3413 kg)*

with brake applied) right 354" *(8.99 m)* left 342" *(8.69 m)*(on concrete surface without brake) right 430" *(10.92 m)* left 404" *(10.26 m)* **Power take-off** 540 rpm at 1800 engine rpm **Unladen tractor mass** 6620 lb *(3003 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

***NOTE**: Tractor is shipped with rear weights — 320 lb *(145 kg)* and front weight package — 405 lb *(184 kg)*.

REMARKS: All test results were determined from observed data obtained in accordance with official SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 129 °F (34°C). Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The drawbar pull with the speed reducer engaged is limited by manufacturer to 2020 lb *(900 N)*. The cooling air temperature was measured in the airstream of cylinder number 4.

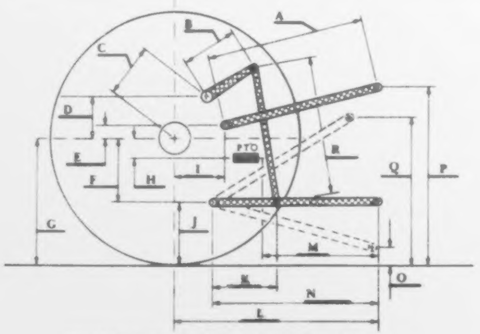
We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1638**, July, 30, 1990.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R.D. GRISSO
G.J. HOFFMAN
Board of Tractor Test Engineers

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	2050	*(14130)*
Location	remote outlet	
Hydraulic oil temperature °F (°C)	135	(57)
Location	hydraulic reservoir	
	Maximum Lift Capacity	
QUICK ATTACH	No	
CATEGORY	II	
LOAD lbs (kg)	2992	*(1357)*
TIME sec	4.92	
HITCH POINT MOVEMENT in (mm)		
Lowest position	12.0	*(305)*
Top of timed range	36.0	*(914)*
Highest position	36.0	*(914)*
LOAD CG MOVEMENT in (mm)		
Lowest position	11.0	*(279)*
Top of timed range	41.6	*(1057)*
Highest position	41.4	*(1052)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	29.3	*743*
B	11.8	*300*
C	12.6	*320*
D	11.0	*279*
E	6.1	*156*
F	9.2	*234*
G	28.1	*714*
H	2.8	*72*
I	11.3	*287*
J	18.9	*480*
K	21.5	*547*
L	40.7	*1033*
M	21.8	*552*
N	45.0	*1143*
O	8.0	*203*
P	37.9	*963*
Q	36.3	*922*
R	20.5	*521*

BELARUS
420A

Belarus 420A Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Darrell W. Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1640—BELARUS 822 DIESEL
(ALSO BELARUS 820 DIESEL)
18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 571 rpm)								
75.15 (56.04)	2200	4.477 (16.948)	0.417 (0.253)	16.78 (3.31)	195 (91)	59 (15)	75 (24)	28.85 (97.70)
Standard Power Take-Off Speed (1001 rpm) — One Hour								
73.55 (54.85)	2183	4.433 (16.780)	0.421 (0.256)	16.59 (3.27)	194 (90)	63 (17)	74 (23)	28.78 (97.46)
Standard Power Take-Off Speed (540 rpm) — One Hour								
71.71 (53.47)	2075	4.221 (15.979)	0.412 (0.250)	16.99 (3.35)	196 (91)	59 (15)	75 (24)	28.80 (97.53)
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
64.75 (48.27)	2228	3.875 (14.668)	0.418 (0.255)	16.71 (3.29)	184 (84)	59 (15)	75 (24)	
	2351	1.330 (5.036)			144 (62)	59 (15)	75 (24)	
33.40 (24.91)	2302	2.300 (8.707)	0.481 (0.293)	14.52 (2.86)	155 (68)	60 (16)	75 (24)	
74.22 (55.36)	2203	4.407 (16.683)	0.415 (0.253)	16.84 (3.32)	187 (86)	61 (16)	76 (24)	
16.85 (12.57)	2320	1.824 (6.904)	0.757 (0.460)	9.24 (1.82)	154 (68)	61 (16)	76 (24)	
49.35 (36.80)	2268	3.025 (11.452)	0.429 (0.261)	16.31 (3.21)	167 (75)	63 (17)	76 (24)	
Av 39.86 **Av (29.73)**	**2275**	**2.794** **(10.579)**	**0.490** **(0.298)**	**14.27** **(2.81)**	**165** **(74)**	**60** **(16)**	**75** **(24)**	**28.81** **(97.56)**

DRAWBAR PERFORMANCE
(Front Drive in Automatic mode)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power — Two Hours 9th (4H) Gear											
62.47 (46.58)	4229 (18.81)	5.54 (8.92)	2200	3.47	4.298 (16.271)	0.481 (0.293)	14.53 (2.86)	190 (88)	68 (20)	75 (24)	28.87 (97.75)
75% of Pull at Maximum Power — Ten Hours 9th (4H) Gear											
49.53 (36.93)	3265 (14.52)	5.69 (9.16)	2244	2.73	3.545 (13.412)	0.500 (0.304)	13.98 (2.75)	185 (85)	74 (23)	86 (30)	28.79 (97.50)
50% of Pull at Maximum Power — Two Hours 9th (4H) Gear											
34.10 (25.43)	2175 (9.67)	5.88 (9.46)	2301	2.09	2.775 (10.505)	0.569 (0.346)	12.29 (2.42)	171 (77)	73 (23)	85 (29)	28.65 (96.95)
50% of Pull at Reduced Engine Speed — Two Hours 14th (8L) Gear											
34.10 (25.42)	2175 (9.67)	5.88 (9.46)	1509	2.07	2.310 (8.745)	0.474 (0.288)	14.76 (2.91)	183 (84)	74 (23)	85 (29)	28.62 (96.90)

Department of Biological Systems Engineering

Dates of Test: June 6-15, 1990

Manufacturer: MINSK TRACTOR WORKS MTZ, Minsk, USSR

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 53.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8396 **Fuel weight** 6.991 lbs/gal *(0.838 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 2.575 gal *(9.748 l)* **Drained from motor** 2.332 gal *(8.828 l)* **Transmission and final drive lubricant** SAE 90 gear lubricant **Hydraulic lubricant** SAE 30 **Total time engine was operated** 39.0 hours

ENGINE: **Make** MTZ Diesel **Model** D240 **Type** four cylinder vertical **Serial No.** 214336 **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** (as specified) 4.331" × 4.921" *(110 mm × 125 mm)* **Compression ratio** 16 to 1 **Displacement** 290 cu in *(4750 ml)* **Starting system** 24 volt **Lubrication** pressure **Air cleaner** oil bath with precleaner **Oil filter** full flow centrifugal **Oil cooler** radiator for crankcase oil **Fuel filter** one cleanable screen and one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat

ENGINE OPERATING PARAMETERS: **Fuel rate:** not to exceed 32.4 lb/h *(14.7 kg/h)* **High idle:** not to exceed 2380 rpm

CHASSIS: **Type** front wheel assist **Serial No.** 295433 **Tread width** rear 56.7" *(1440 mm)* to 82.7" *(2100 mm)* front 53.1" *(1350 mm)* to 70.9" *(1800 mm)* **Wheel base** 96.5" *(2450 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.9" *(937 mm)* Vertical distance above roadway 40.4" *(1025 mm)* Horizontal distance from center of rear wheel tread 0.4" *(11 mm)* to the right **Hydraulic control system** direct engine drive with throwout lever (engaged during test) **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.2 *(1.9)* second 1.6 *(2.6)* third 2.1 *(3.3)* fourth 2.7 *(4.4)* fifth 3.5 *(5.6)* sixth 4.3 *(6.9)* seventh 4.6 *(7.4)* eighth 5.1 *(8.2)* ninth 5.7 *(9.1)* tenth 6.0 *(9.6)* eleventh 6.7 *(10.8)* twelfth 7.3 *(11.8)* thirteenth 7.9 *(12.7)* fourteenth 8.7 *(13.9)* fifteenth 9.7 *(15.6)* sixteenth 11.5 *(18.4)* seventeenth 16.1 *(25.9)* eigthteenth 21.3 *(34.3)* reverse 2.5 *(4.1)*, 3.4 *(5.4)*, 4.3*(7.0)*, 5.7 *(9.2)* **Clutch** single dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 156" *(3.96 m)* left 191" *(4.85 m)* (on concrete surface without brake) right 175" *(4.45 m)* left 215" *(5.46 m)* **Turning space diameter** (on concrete surface with brake applied) right 323" *(8.20 m)* left 393" *(9.98 m)* (on concrete surface without brake) right 361" *(9.17 m)* left 441" *(11.20 m)* **Power take-off** 540 rpm at 2075 engine rpm and 1000 rpm at 2182 engine rpm **Unladen tractor mass** 8480 lb *(3846 kg)*

REPAIRS AND ADJUSTMENTS: One fuel injector was replaced during preliminary PTO test.

***NOTE:** Tractor is shipped with rear weights — 168 lb *(76 kg)* and front weight package — 492 lb *(223 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with official SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump was maintained at 164 °F *(73°C)*. Twelve gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1640**, July, 30, 1990

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R.D. GRISSO
G.J. HOFFMAN
Board of Tractor Test Engineers

MAXIMUM POWER IN SELECTED GEARS

47.90 (35.72)	9975 (44.36)	1.80 (2.90)	2241	14.58	3rd (2L) Gear	183 (84)	72 (22)	80 (27)	28.66 (97.05)
59.20 (44.15)	8906 (39.61)	2.49 (4.01)	2200	8.56	4th (2H) Gear	185 (85)	72 (22)	82 (28)	28.64 (96.99)
62.58 (46.67)	7021 (31.24)	3.33 (5.36)	2200	5.63	5th (3L) Gear	185 (85)	67 (19)	73 (23)	28.84 (97.66)
63.37 (47.26)	5741 (25.53)	4.14 (6.66)	2198	4.58	6th (4L) Gear	185 (85)	67 (19)	73 (23)	28.84 (97.66)
63.33 (47.23)	5305 (23.60)	4.48 (7.20)	2199	4.15	7th (3H) Gear	184 (84)	67 (19)	72 (22)	28.83 (97.63)
63.55 (47.39)	4825 (21.45)	4.94 (7.95)	2199	3.72	8th (5L) Gear	187 (86)	66 (19)	74 (23)	28.85 (97.70)
64.27 (47.93)	4350 (19.35)	5.54 (8.92)	2201	3.36	9th (4H) Gear	188 (86)	66 (19)	76 (24)	28.87 (97.77)
63.41 (47.28)	4095 (18.21)	5.81 (9.35)	2197	3.29	10th (6L) Gear	187 (86)	66 (19)	75 (24)	28.86 (97.73)
63.95 (47.69)	3640 (16.19)	6.59 (10.60)	2199	3.07	11th (5H) Gear	186 (86)	66 (19)	74 (23)	28.85 (97.70)
63.10 (47.06)	3291 (14.64)	7.19 (11.57)	2201	2.77	12th (7L) Gear	183 (84)	67 (19)	72 (22)	28.83 (97.63)
63.52 (47.36)	3079 (13.69)	7.74 (12.46)	2199	2.55	13th (6H) Gear	186 (85)	66 (19)	75 (24)	28.86 (97.73)
62.19 (46.38)	2731 (12.15)	8.54 (13.74)	2200	2.33	14th (8L) Gear	181 (83)	67 (19)	71 (22)	28.82 (97.60)

LUGGING ABILITY IN 9th (4H) GEAR

Crankshaft Speed rpm	2201	1980	1755	1533	1318	1101
Pull—lbs (kN)	4350 (19.35)	4580 (20.37)	4997 (22.23)	5344 (23.77)	5353 (23.81)	5095 (22.66)
Increase in Pull %	0	5	15	23	23	17
Power—Hp (kW)	64.27 (47.93)	60.74 (45.30)	58.49 (43.62)	54.58 (40.70)	46.98 (35.03)	37.44 (27.92)
Speed—Mph (km/h)	5.54 (8.92)	4.97 (8.00)	4.39 (7.06)	3.83 (6.16)	3.29 (5.30)	2.76 (4.44)
Slip %	3.36	3.58	3.87	4.15	4.30	4.15

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	81.5
75% of Pull at Maximum Power—Ten Hours	80.5
50% of Pull at Maximum Power—Two Hours	81.0
50% of Pull at Reduced Engine Speed—Two Hours	80.5
Bystander in 17th (9L) gear	89.0

MAXIMUM POWER IN SELECTED GEARS
MAXIMUM POWER (4WD MODE)

64.16 (47.85)	4346 (19.33)	5.54 (8.91)	2199	2.86	9th (4H) Gear	188 (86)	66 (19)	76 (24)	28.87 (97.77)

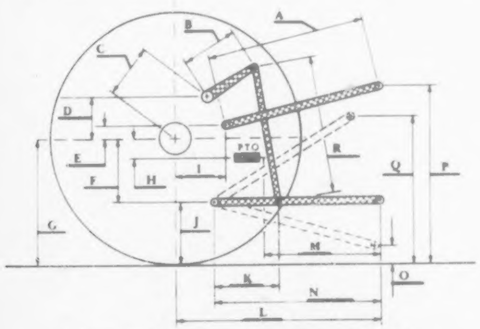
MAXIMUM PULL (2WD MODE)

51.16 (38.15)	8053 (35.82)	2.38 (3.83)	2234	14.49	4th (2H) Gear	180 (82)	72 (22)	81 (27)	28.65 (97.02)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 400/965 15.5-38;8; 24 (165)	Two 400/965 15.5-38;8; 24 (165)
Ballast	—Liquid (each)	720 lb (327 kg)	None
	—Cast Iron (each)	150 lb (68 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 290/508 11.2-20;8; 26 (180)	Two 290/508 11.2-20;8; 26 (180)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	15 lb (7 kg)	None
Height of Drawbar		15.5 in (395 mm)	15.5 in (395 mm)
Static Weight with Operator	—Rear	7620 lb (3456 kg)	5880 lb (2667 kg)
	—Front	3455 lb (1567 kg)	3430 lb (1556 kg)
	—Total	11075 lb (5023 kg)	9310 lb (4223 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kPa)*	2800	*(19300)*
Location	remote outlet	
Hydraulic oil temperature °F *(°C)*	151	*(66)*
Location	hydraulic reservoir	
	Maximum Lift Capacity	
QUICK ATTACH	No	
CATEGORY	II	
LOAD lbs *(kg)*	3324	*(1508)*
TIME sec	2.14	
HITCH POINT MOVEMENT in *(mm)*		
Lowest position	12.0	*(305)*
Top of timed range	36.0	*(914)*
Highest position	36.5	*(927)*
LOAD CG MOVEMENT in *(mm)*		
Lowest position	12.2	*(309)*
Top of timed range	43.3	*(1099)*
Highest position	44.8	*(1137)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	21.0	*533*
B	10.2	*260*
C	17.6	*447*
D	10.6	*270*
E	6.3	*160*
F	9.6	*245*
G	28.4	*721*
H	4.6	*117*
I	19.0	*483*
J	18.8	*478*
K	15.1	*384*
L	40.0	*1016*
M	22.6	*573*
N	31.1	*791*
O	8.0	*203*
P	37.8	*961*
Q	36.4	*924*
R	18.4	*467*

Belarus 822 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell W. Nelson, Dean and Director

NEBRASKA TRACTOR TEST 1641—BELARUS 1770 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed — Two hours (PTO Speed — 1024 rpm)								
167.60 *(124.98)*	2100	10.119 *(38.304)*	0.422 *(0.257)*	16.56 *(3.26)*	195 *(91)*	59 *(15)*	75 *(24)*	28.61 *(96.88)*
Standard Power Take-Off Speed (1000 rpm) — One Hour								
171.27 *(127.71)*	2050	10.187 *(38.563)*	0.416 *(0.253)*	16.81 *(3.31)*	198 *(92)*	60 *(16)*	76 *(25)*	28.59 *(96.82)*
VARYING POWER AND FUEL CONSUMPTION — Two Hours								
148.98 *(111.09)*	2193	9.385 *(35.526)*	0.440 *(0.268)*	15.87 *(3.13)*	192 *(89)*	62 *(17)*	78 *(25)*	
	2295	2.742 *(10.380)*			169 *(76)*	65 *(18)*	83 *(28)*	
76.10 *(56.75)*	2245	5.930 *(22.449)*	0.545 *(0.331)*	12.83 *(2.53)*	173 *(78)*	63 *(17)*	78 *(26)*	
167.22 *(124.69)*	2101	10.007 *(37.881)*	0.418 *(0.254)*	16.71 *(3.29)*	194 *(90)*	63 *(17)*	80 *(26)*	
38.44 *(28.67)*	2265	4.502 *(17.040)*	0.819 *(0.498)*	8.54 *(1.68)*	169 *(76)*	64 *(18)*	80 *(27)*	
113.12 *(84.35)*	2227	7.626 *(28.866)*	0.471 *(0.287)*	14.83 *(2.92)*	180 *(82)*	64 *(18)*	81 *(27)*	
Av **90.78** Av *(67.68)*	**2221**	**6.000** *(23.357)*	**0.516** *(0.314)*	**13.55** *(2.67)*	**179** *(82)*	**63** *(17)*	**80** *(27)*	**28.58** *(96.77)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg *(kPa)*
Maximum Available Power — Two Hours 6th (2-2) Gear											
148.11 *(110.44)*	9751 *(43.37)*	5.70 *(9.17)*	2100	4.91	10.156 *(38.444)*	0.479 *(0.292)*	14.58 *(2.87)*	183 *(84)*	50 *(10)*	59 *(15)*	28.78 *(97.46)*
75% of Pull at Maximum Power — Ten Hours 6th (2-2) Gear											
116.99 *(87.24)*	7200 *(32.03)*	6.09 *(9.81)*	2213	3.42	8.827 *(33.414)*	0.527 *(0.321)*	13.25 *(2.61)*	177 *(81)*	46 *(8)*	56 *(13)*	28.90 *(97.86)*
50% of Pull at Maximum Power — Two Hours 6th (2-2) Gear											
83.08 *(61.95)*	4989 *(22.19)*	6.24 *(10.05)*	2242	2.48	7.116 *(26.938)*	0.599 *(0.364)*	11.68 *(2.30)*	176 *(80)*	51 *(10)*	59 *(15)*	28.73 *(97.29)*
50% of Pull at Reduced Engine Speed — Two Hours 8th (2-4) Gear											
83.11 *(61.98)*	4990 *(22.19)*	6.25 *(10.05)*	1678	2.66	6.179 *(23.391)*	0.520 *(0.316)*	13.45 *(2.65)*	175 *(79)*	50 *(10)*	54 *(12)*	28.70 *(97.19)*
MAXIMUM POWER IN SELECTED GEARS											
124.68 *(92.98)*	18440 *(82.02)*	2.54 *(4.08)*	2188	14.65	2nd (1-2) Gear			178 *(81)*	46 *(8)*	54 *(12)*	28.79 *(97.49)*
138.69 *(103.42)*	17487 *(77.79)*	2.97 *(4.79)*	2098	11.70	3rd (1-3) Gear			179 *(82)*	46 *(8)*	54 *(12)*	28.79 *(97.49)*
142.98 *(106.62)*	15396 *(68.48)*	3.48 *(5.60)*	2099	8.95	4th (1-4) Gear			179 *(82)*	47 *(8)*	55 *(13)*	28.79 *(97.49)*
150.22 *(112.02)*	11743 *(52.23)*	4.80 *(7.72)*	2100	6.01	5th (2-1) Gear			181 *(82)*	49 *(9)*	57 *(14)*	28.79 *(97.49)*
151.30 *(112.82)*	9977 *(44.38)*	5.69 *(9.15)*	2099	5.02	6th (2-2) Gear			183 *(84)*	49 *(9)*	57 *(14)*	28.79 *(97.49)*
150.36 *(112.13)*	8315 *(36.98)*	6.78 *(10.91)*	2099	4.15	7th (2-3) Gear			180 *(82)*	47 *(8)*	55 *(13)*	28.79 *(97.49)*
148.22 *(110.53)*	7174 *(31.91)*	7.75 *(12.47)*	2100	3.48	8th (2-4) Gear			180 *(82)*	48 *(9)*	56 *(13)*	28.79 *(97.49)*

Department of Biological Systems Engineering

Dates of Test: May 7-17, 1990

Manufacturer: KHARKOV TRACTOR PLANT, Kharkov–7, USSR

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F** *(15/15°C)* 0.8396 **Fuel weight** 6.991 lbs/gal *(0.838 kg/l)* **Oil SAE 30 API service classification** SE, SF, CC, CD **To motor** 5.742 gal *(21.736 l)* **Drained from motor** 4.129 gal *(15.629 l)* **Transmission and hydraulic lubricant** SAE 30 **Final drive lubricant** SAE 90 Gear Lube **Total time engine was operated** 40.5 hours.

ENGINE: Make Belarus Diesel **Model** SMD 63 **Type** six cylinder vee with turbo charger **Serial No.** 953219 **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** (as specified) 5.118" × 4.528" *(130 mm × 115 mm)* **Compression ratio** 15 to 1 **Displacement** 558 cu in *(9150 ml)* **Starting system** 24 volt **Lubrication** pressure **Air cleaner** two paper elements **Air compressor** direct engine drive **Oil filter** full flow centrifugal **Oil cooler** radiator for crankcase oil, radiator for transmission oil **Fuel filter** three paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

ENGINE OPERATING PARAMETERS: Fuel rate 70-73 lb/h *(31.8-33.1 kg/h)* **High idle** 2260-2300 rpm **Turbo boost** nominal 11-13 psi *(75-90 kPa)* as measured 12.0 psi *(83 kPa)*

CHASSIS: Type four wheel drive **Serial No.** 489886 **Tread width** rear 73.2" *(1860 mm)* front 73.2" *(1860 mm)* **Wheel base** 112.6" *(2860 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 69.9" *(1775 mm)* Vertical distance above roadway 41.7" *(1060 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive with throwout lever (engaged during drawbar tests) **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.3 *(3.7)* second 2.7 *(4.4)* third 3.2 *(5.2)* fourth 3.6 *(5.9)* fifth 4.8 *(7.8)* sixth 5.7 *(9.2)* seventh 6.7 *(10.8)* eighth 7.6 *(12.3)* ninth 11.2 *(18.0)* tenth 13.1 *(21.1)* eleventh 15.5 *(24.9)* twelfth 17.6 *(28.3)* reverse 3.5 *(5.6)*, 4.1 *(6.6)*, 4.8 *(7.8)*, 5.5 *(8.8)* **Clutch** double dry disc pneumatically operated by foot pedal **Brakes** drum and shoe pneumatically operated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 264" *(6.70 m)* left 264" *(6.70 m)* **Turning space diameter** (on concrete surface without brake) right 575" *(14.60 m)* left 575" *(14.60*

LUGGING ABILITY IN 6th (2-2) GEAR

Crankshaft Speed rpm	2099	1891	1684	1465	1257	1052
Pull—lbs (kN)	9977 (44.38)	11690 (52.00)	12819 (57.02)	11953 (53.17)	11273 (50.14)	10447 (46.47)
Increase in Pull %	0	17	28	20	13	5
Power—Hp (kW)	151.30 (112.82)	158.04 (117.85)	153.13 (114.19)	124.99 (93.20)	101.48 (75.67)	79.13 (59.01)
Speed—Mph (km/h)	5.69 (9.15)	5.07 (8.16)	4.48 (7.21)	3.92 (6.31)	3.38 (5.43)	2.84 (4.57)
Slip %	5.02	5.94	6.79	6.23	5.80	5.38

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	81.5
75% of Pull at Maximum Power—Ten Hours	82.5
50% of Pull at Maximum Power—Two Hours	85.0
50% of Pull at Reduced Engine Speed—Two Hours	85.0
Bystander in 11th (3-3) gear	88.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 610-665/25 ; 18-26P 12; 18 (125)	Two 610-665/25 ; 18-26P 12; 18 (125)
Ballast	—Liquid (each)	430 lb (195 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 610-665/25 ; 18-26P 12; 18 (125)	Two 610-665/25 ; 18-26P 12; 18 (125)
Ballast	—Test equip (each)	22 lb (10 kg)	None
	—Liquid (each)	None	None
Height of Drawbar		20.0 in (510 mm)	20.0 in (510 mm)
Static Weight with Operator	—Rear	8280 lb (3756 kg)	7420 lb (3366 kg)
	—Front	12210 lb (5538 kg)	12165 lb (5518 kg)
	—Total	20490 lb (9294 kg)	19585 lb (8884 kg)

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi (kPa)	*2700	(18617)
Location	remote outlet	
Hydraulic oil temperature °F (°C)	175	(79)
Location	hydraulic reservoir	
	Maximum Lift Capacity	
QUICK ATTACH	No	
CATEGORY	III	
LOAD lbs (kg)	12482	(5662)
TIME sec	6.22	
HITCH POINT MOVEMENT in (mm)		
Lowest position	8.0	(203)
Top of timed range	34.1	(866)
Highest position	42.6	(1082)
LOAD CG MOVEMENT in (mm)		
Lowest position	10.9	(276)
Top of timed range	30.5	(775)
Highest position	37.5	(952)

* The observed system pressure, 2700 psi (18617 kPa) exceeds manufacturer's maximum stated pressure of 2611 psi (18000 kPa).

m) **Power take-off** 1000 rpm at 2050 engine rpm and 540 rpm at 2025 engine rpm **Unladen tractor mass** 19400 lb *(8800 kg)*

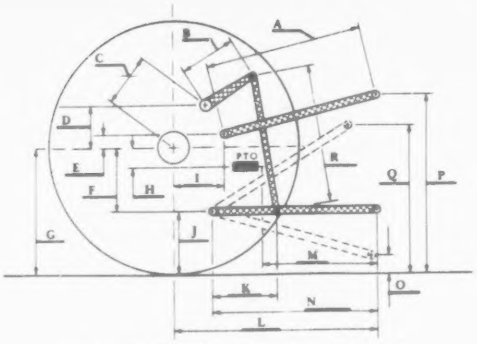
REPAIRS AND ADJUSTMENTS: The parking brake return spring was replaced at the end of the test sequence.

REMARKS: All test results were determined from observed data obtained in accordance with official SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 118 °F *(48°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is as true and correct report of official Tractor Test No. **1641**, July, 30, 1990.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R.D. GRISSO
G.J. HOFFMAN
Board of Tractor Test Engineers



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	34.0	*864*
B	23.6	*600*
C	30.6	*778*
D	18.5	*470*
E	18.5	*470*
F	7.7	*195*
G	30.0	*762*
*H	−7.6	*−194*
I	24.4	*620*
J	22.3	*567*
K	29.2	*741*
L	58.3	*1482*
M	33.7	*857*
N	37.1	*942*
O	8.0	*203*
P	44.3	*1125*
Q	46.4	*1178*
R	28.0	*711*

*PTO is above rear axle

Belarus 1770 Diesel

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell W. Nelson, Dean and Director

Ten-Year Summary of Test Reports, 1981-1990

						ENGINE									FUEL CONSUMPTION (HP Hours Per Gallon) at:-		—Varing Drawbar Power—		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cyl-inders	Bore and Stroke	Dis-place-ment Cu. in.	Rated RPM	Max. PTO HP at Rated Engine RPM	Std. PTO RPM	Max. PTO HP Std. PTO RPM	Max. Draw-bar HP	MPH at Max. Dwb. HP	Max. Lbs. Pull	Max. PTO HP at Std. PTO RPM	PTO Average at Varying Power	Max. Avail-able Power	75% of Pull Max. Power	50% of Pull at Max. Power
Allis Chalmers																			
6060 8 Speed	1397	Die.	8945	2480	4	3.876x4.25	200	2300	63.83	540	64.90	52.24	4.83	6846	16.26	12.07	13.27	11.99	10.10
6070	1545	Die.	10515	3055	4	3.875x4.25	200	2300	70.78	540	71.01	59.56	7.90	7997	16.45	12.60	13.38	12.30	10.40
6080 12 Speed	1398	Die.	11790	4200	4	3.876x4.25	200	2300	83.66	1000	74.49	72.32	5.74	9003	15.70	13.14	14.27	12.81	10.93
6140	1445	Die.	6195	1735	3	3.358x4.055	142	2500	41.08	541	38.04	33.97	5.20	4768	13.47	10.20	10.87	10.25	8.88
8010 Powershift	1446	Die.	13185	555	6	3.875x4.25	301	2300	107.38	1000	109.55	93.01	6.16	9102	15.01	11.49	12.57	11.48	9.54
8030 Powershift	1447	Die.	17100	2085	6	4.25x5.00	426	2300	133.75	1000	134.42	116.65	6.35	13348	15.25	11.78	12.93	11.87	10.00
8050 Powershift	1448	Die.	19380	4075	6	4.25x5.00	426	2300	152.40	1000	155.15	134.13	4.89	16728	15.88	12.51	13.71	12.73	10.80
8070 Powershift	1449	Die.	22370	5520	6	4.25x5.00	426	2400	170.72	1000	171.44	147.29	5.87	18777	16.48	12.81	13.67	12.59	10.64
Belarus																			
420A/400A	1638	Die.	8665	1140	4	4.134x4.724	254	1800	50.68	540	50.68	44.91	3.83	7435	16.30	13.62	14.06	13.56	11.77
822/820	1640	Die.	11075	1765	4	4.331x4.921	290	2200	75.15	540	71.71	64.27	5.54	9973	16.99	14.27	14.53	13.98	12.29
1770	1641	Die.	20490	905	6	5.118x4.528	558	2100	167.60	1000	171.27	151.30	5.69	18440	16.81	13.55	14.58	13.25	11.68
Big Bud																			
525/50 9 Speed	1400	Die.	51920	0	6	6.25x6.25	1150	2100				421.49	5.64	42216	—		14.87	13.97	12.01
Case																			
1190 Manual	1378	Die.	6780	2160	3	3.939x4.500	165	2200	43.09	540	38.54	36.60	7.60	4620	14.99	13.09	12.22	12.59	11.39
1290 Manual	1379	Die.	9320	2750	4	3.939x4.000	195	2200	53.73	540	47.80	46.41	4.97	6851	15.20	13.34	12.41	12.90	11.68
1390 Manual	1380	Die.	9780	3160	4	3.939x4.500	219	2200	60.59	1000	58.40	52.16	4.92	7348	15.58	13.36	12.89	13.24	11.77
1490 Manual	1381	Die.	11305	3600	4	3.939x4.500	219	2200	70.51	1000	68.75	60.45	5.63	8340	17.18	13.62	13.82	13.00	11.25
1490 Powershift	1382	Die.	11060	2635	4	3.939x4.500	219	2200	70.91	1000	70.48	61.56	6.76	8405	16.42	12.36	13.12	12.01	10.20
1594 Synchro	1546	Die.	11100	1755	6	3.939x4.500	329	2300	85.90	1000	80.83	73.54	5.29	8331	17.04	14.04	14.26	13.56	11.99
1594 Powershift	1547	Die.	11210	1745	6	3.939x4.500	329	2300	85.54	1000	81.94	70.59	5.47	8198	16.86	13.52	13.59	13.10	11.45
1690 Manual	1383	Die.	12470	3715	6	3.939x4.500	329	2300	90.39	1000	87.76	78.08	4.27	10536	15.95	13.95	13.20	13.50	12.28
1896 Powershift	1548	Die.	13925	430	6	4.016x4.724	359	2100	95.92	997	95.92	86.45	4.77	12357	16.71	12.94	14.82	13.65	11.34
2094 Powershift	1525	Die.	14750	560	6	4.625x5.000	504	2100	110.50	998	110.50	100.12	6.34	11910	15.40	12.26	13.81	12.93	11.27
2096 Powershift	1549	Die.	14940	760	6	4.016x4.724	359	2100	115.67	998	115.67	101.40	6.37	12915	17.38	14.01	15.21	13.92	11.95
2294 Powershift	1526	Die.	15670	1280	6	4.625x5.000	504	2100	131.97	998	131.97	116.38	6.31	13017	14.86	11.82	13.11	12.21	10.51
2394 Powershift	1527	Die.	18595	2355	6	4.625x5.000	504	2100	162.15	1002	162.15	142.07	5.53	15497	15.46	12.70	13.42	12.71	11.04
2594 Powershift	1529	Die.	19790	3570	6	4.625x5.000	504	2100	182.07	1002	[illegible]	161.96	6.40	16874	15.22	12.88	13.37	12.94	11.63
3294 Powershift	1528	Die.	17980	0	6	4.625x5.000	504	2100	162.63	998	162.63	143.68	5.75	16242	15.32	12.58	13.55	12.76	11.13
4994 Powershift	1530	Die.	39930	8615	8	5.00x5.51	866	2100	344.04	991	344.04	306.43	7.20	34519	17.03	13.81	14.67	13.87	12.18
Case IH																			
685	1604	Die.	8845	3010	4	3.875x5.06	239	2400	61.02	540	58.80	54.63	5.42	7207	14.76	11.56	12.66	11.86	9.95
2394 Powershift	1582	Die.	18630	2230	6	4.625x5.00	504	2100	162.92	1002	162.92	148.98	5.12	17425	15.81	13.02	14.36	13.56	11.89
3394 Powershift	1583	Die.	18610	2810	6	4.625x5.00	504	2100	162.86	1002	162.86	144.82	5.08	17421	15.39	12.59	13.51	12.48	10.55
3594 Powershift	1584	Die.	20500	2910	6	4.625x5.00	504	2100	182.27	1002	182.27	165.12	5.07	20384	15.45	13.05	13.70	12.91	11.20
John Deere																			
750 8 Speed	1504	Die.	2150	155	3	3.15x3.35	78.2	2400	18.54	540	19.80	15.73	6.41	1661	15.06	11.61	12.48	11.53	9.83
1250	1437	Die.	5180	90	3	3.74x4.33	143	2500	40.70	540	40.98	34.01	5.39	3750	17.00	13.56	13.90	12.71	10.68
1450 9 Speed	1505	Die.	6570	1340	4	3.74x4.33	190	2400	51.39	540	50.93	43.79	7.68	5321	17.60	14.01	14.74	13.67	11.64
1650 9 Speed	1506	Die.	7785	2435	4	3.74x4.33	190	2300	62.22	540	62.70	54.06	7.79	6572	18.81	15.53	15.96	14.97	12.95
2040 8 Speed TSS (1)	1393	Die.	6040	265	3	4.19x4.33	179	2500	40.44	540	40.22	33.21	5.16	5541	14.87	10.93	11.69	10.71	8.76
2150 16 Speed	1469	Die.	5930	820	3	4.19x4.33	179	2500	46.47	540	46.13	38.69	6.98	4875	14.77	11.15	11.88	11.24	9.47
2240 8 Speed TSS (1)	1394	Die.	6205	310	3	4.19x4.33	179	2500	50.90	540	49.20	42.13	5.08	5777	15.32	11.75	11.98	11.45	9.78
2350 16 Speed	1470	Die.	7190	380	4	4.19x4.33	239	2500	56.18	540	55.69	47.53	6.77	5688	15.67	11.66	12.96	11.87	9.87
2550 16 Speed	1471	Die.	8485	1575	4	4.19x4.33	239	2500	65.94	540	65.53	56.24	6.22	6979	15.42	11.85	12.83	12.09	10.10
2750 16 Speed	1472	Die.	9625	2125	4	4.19x4.33	239	2500	75.35	540	75.07	63.98	4.75	7581	16.11	12.29	13.13	12.37	10.51
2755	1605	Die.	9715	1170	4	4.19x4.33	239	2300	76.57	1000	77.63	66.05	5.18	7498	17.82	14.04	14.87	14.19	12.14
2950 16 Speed	1473	Die.	11045	945	6	4.19x4.33	359	2500	85.37	1000	85.50	73.30	6.57	8768	16.33	12.21	13.58	12.45	10.53
2955	1606	Die.	11150	130	6	4.19x4.33	359	2300	86.22	1000	85.54	74.20	5.42	9971	17.41	13.63	14.82	13.79	11.64
3150	1589	Die.	12300	355	6	4.19x4.33	359	2400	96.06	997	96.06	83.04	5.64	10507	16.45	13.09	14.23	13.34	11.21

Ten-Year Summary of Test Reports, 1981-1990

MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	ENGINE No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM	Max. PTO HP at Rated Engine RPM	Std. PTO RPM	Max. PTO HP Std. PTO RPM	Max. Drawbar HP	MPH at Max. Dwbr. HP	Max. Lbs. Pull	FUEL CONSUMPTION (HP Hours Per Gallon) at:- Max. PTO HP at Std. PTO RPM	PTO Average at Varying Power	—Varing Drawbar Power— Max. Available Power	75% of Pull Max. Power	50% of Pull at Max. Power
John Deere																			
4050 Quad	1474	Die	13005	835	6	4.57x4.75	466	2200	101.49	1002	101.49	92.05	6.49	10331	15.12	11.72	13.44	12.54	10.64
4050 Quadrange	1590	Die	13670	1280	6	4.19x4.33	359	2200	105.89	1003	105.89	96.35	5.86	11381	17.23	13.60	15.34	14.25	12.13
4050 Powershift	1457	Die	13030	310	6	4.57x4.75	466	2200	100.95	1002	100.95	88.75	7.88	11058	15.08	11.59	12.60	11.69	9.65
4050 Powershift	1591	Die	13685	1000	6	4.19x4.33	359	2200	105.69	1003	105.69	91.64	8.51	11378	17.40	13.78	14.61	13.47	10.99
4250 Quad	1475	Die	14990	1620	6	4.57x4.75	466	2200	120.21	1002	120.21	108.77	5.71	12858	15.70	12.21	13.90	12.82	10.64
4250 Powershift	1458	Die	14970	1115	6	4.57x4.75	466	2200	120.86	1002	120.86	105.11	8.36	12802	15.78	12.33	13.44	12.08	10.17
4450 Quad	1476	Die	16680	2380	6	4.57x4.75	466	2200	140.33	1002	140.33	125.18	5.01	15069	16.36	13.08	14.42	13.45	11.61
4450 Quad (2)	1476	Die	16760	2005	6	4.57x4.75	466	2200	140.33	1002	140.33	126.34	5.37	16278	16.36	13.08	14.68		
4450 Powershift	1459	Die	16745	1795	6	4.57x4.75	466	2200	140.43	1002	140.43	121.94	8.03	15014	16.15	12.94	13.63	12.58	10.60
4450 Powershift (2)	1459	Die	16625	1225	6	4.57x4.75	466	2200	140.43	1002	140.43	122.51	8.58	16154	16.15	12.94	13.66		
4650 Quad	1477	Die	19615	1615	6	4.57x4.75	466	2200	165.70	998	165.70	145.58	6.45	16814	16.99	13.90	14.80	13.81	12.11
4650 Quad (2)	1477	Die	19590	1150	6	4.57x4.75	466	2200	165.70	998	165.70	147.71	5.73	18931	16.99	13.90	14.9[illegible]		
4650 Powershift	1460	Die	19660	1075	6	4.57x4.75	466	2200	165.52	998	165.52	143.33	8.12	16746	16.96	13.78	14.25	13.15	11.31
4650 Powershift (2)	1460	Die	19740	695	6	4.57x4.75	466	2200	165.52	998	165.52	146.06	8.47	18794	16.96	13.78	14.44		
4850 Powershift	1461	Die	21435	2715	6	4.57x4.75	466	2200	192.99	998	192.99	171.27	8.04	18789	17.47	14.50	14.68	13.80	12.01
4850 Powershift (2)	1461	Die	21440	27[illegible]	6	4.57x4.75	466	2200	192.99	998	192.99	172.60	4.26	20810	17.47	14.50	14.93		
8450	1436	Die	29150		6	4.57x4.75	466	2100	186.98	993	186.98	175.73	4.50	26567	15.69	12.91	14.45	13.53	11.63
8650	1435	Die	30270	0	6	5.125x5.00	619	2100	238.56	993	238.56	221.80	5.55	28257	15.53	12.65	14.26	13.22	11.52
8850	1434	Die	37700	0	8	5.51x5.00	955	2100	303.99	996	303.99	274.25	5.23	35330	15.74	12.82	14.06	13.34	11.65

(1) With mechanical front wheel drive (2) Supplementary test with radial ply tires

Deutz																			
DX 120	1405	Die	14950	1980	6	4.02x4.92	374	2400	111.29	1000	101.90	97.41	7.32	12615	16.40	13.84	13.59	13.48	12.03
DX 130	1404	Die	17630	3690	6	4.02x4.92	374	2300	121.27	1000	121.36	105.63	4.76	14406	17.63	13.77	14.14	13.10	11.26
Deutz Allis																			
6260	1574	Die	8790	1530	3	4.02x4.92	187	2500	57.09	540	55.35	50.73	4.60	7270	15.47	13.20	12.95	13.46	11.63
7085	1575	Die	13660	3580	4	4.02x4.92	249	2300	85.18	1000	84.35	75.13	7.56	10502	16.89	14.03	14.40	13.76	12.00
7120	1576	Die	17595	5465	6	4.02x4.92	374	2300	122.06	1000	123.15	105.49	5.06	13633	17.15	13.63	14.20	12.98	11.36
9150	1633	Die	18625	2710	6	4.016x4.921	374	2400	151.07	1000	150.22	135.88	5.14	17334	16.47	13.26	14.53	13.37	11.44
9170	1634	Die	21480	4015	6	4.921x5.118	584	2300	173.37	1000	178.70	158.67	4.93	19027	16.71	12.47	13.99	12.75	10.72
9190	1635	Die	19150	450	6	4.921x5.118	584	2300	193.55	1000	196.96	173.17	4.92	18970	16.38	11.89	113.57	12.20	10.27
Deutz Fahr																			
DX 3.50	1574	Die	8790	1530	3	4.02x4.92	187	2500	57.09	540	55.35	50.73	4.60	7270	15.47	13.20	12.95	13.46	11.63
DX 4.70	1575	Die	13660	3580	4	4.02x4.92	249	2300	85.18	1000	84.35	75.13	7.56	10502	16.89	14.03	14.40	13.76	12.00
DX 6.50	1576	Die	17595	5465	6	4.02x4.92	374	2300	122.06	1000	123.15	105.49	5.06	13633	17.15	13.63	14.20	12.98	11.36
Ford																			
1510 (12x4) Manual	1500	Die	3205	975	3	3.03x3.15	68.2	2800	19.72	540	20.45	16.99	6.92	1952	13.21	10.32	11.14	10.2[illegible]	8.50
1510 (12x4) Synchro	1501	Die	3200	915	3	3.03x3.15	68.2	[illegible]00	19.98	540	18.68	16.83	6.70	1900	13.50	10.29	10.97	10.2[illegible]	8.57
1710 (12x4) Manual	1502	Die	3510	1040	3	3.31x3.31	85.2	2700	23.88	540	22.19	21.02	7.06	2700	13.42	10.16	11.36	10.76	8.98
1710 (12x4) Synchro	1503	Die	3530	1060	3	3.31x3.31	85.2	2700	23.79	540	22.34	21.23	5.68	2680	13.18	9.92	11.04	10.56	8.81
1910 (12x4) Manual	1507	Die	4250	1270	3	3.346x3.937	103.9	2500	28.60	540	28.29	25.57	6.78	3340	12.94	10.32	11.14	10.86	9.17
1910 (12x4) Synchro	1508	Die	4325	1285	3	3.346x3.937	103.9	2500	28.52	540	28.30	25.62	6.79	3449	12.48	10.36	10.99	10.78	9.09
2110 (12x4) Manual	1509	Die	5105	1470	4	3.346x3.937	138.5	2500	34.79	540	34.91	30.80	7.01	3868	14.01	10.69	11.80	10.95	9.04
2110 (12x4) Synchro	1510	Die	5110	1450	4	3.346x3.937	138.5	2500	35.11	540	35.56	31.11	6.99	3728	14.01	10.71	11.77	11.11	9.35
2610 (8x2)	1421	Die	5940	1780	3	4.20x4.20	175	2000	36.69	540	35.14	31.45	5.52	4473	16.15	12.82	13.03	12.71	10.51
2810 (8x2)	1573	Die	5935	1295	3	4.20x3.80	158	2000	32.83	540	31.82	29.14	5.88	4036	15.20	11.57	12.88	11.99	9.96
2910 (8x2)	1491	Die	5925	1295	3	4.20x4.20	175	2000	36.62	540	35.09	30.45	5.77	4237	16.04	12.51	13.18	12.31	10.49
2910 (8x4)	1492	Die	5955	1305	3	4.20x4.20	175	2000	36.40	540	34.75	31.03	5.68	4223	15.95	12.58	13.00	12.24	10.59
3610 (8x2)	1422	Die	6340	2070	3	4.40x4.20	192	2000	42.26	540	40.17	36.80	5.85	4964	15.95	12.65	13.37	12.69	11.20
3610 (8x4)	1423	Die	6340	2045	3	4.40x4.20	192	2000	42.47	540	40.01	35.57	8.55	4917	16.26	12.94	12.85	12.44	10.53
3910 (8x2)	1493	Die	6440	1760	3	4.40x4.20	192	2000	42.62	540	40.39	37.02	5.93	4931	15.86	12.48	13.33	12.66	10.7[illegible]
3910 (8x4)	1494	Die	6435	1735	3	4.40x4.20	192	2000	42.67	540	41.16	36.22	5.85	4934	15.64	12.63	13.16	12.34	10.59
4110 (8x2)	1424	Die	7500	2850	3	4.40x4.40	201	2200	48.33	540	42.65	41.25	4.51	5681	16.37	12.64	13.26	12.34	10.76

						ENGINE									FUEL CONSUMPTION (HP Hours Per Gallon) at:-		—Varing Drawbar Power—		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM	Max. PTO HP at Rated Engine RPM	Std PTO RPM	Max. PTO HP Std. PTO RPM	Max. Drawbar HP	MPH at Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP at Std. PTO RPM	PTO Average at Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull at Max. Power
4110 (8x4)	1425	Die	7500	2785	3	4.40x4.40	201	2200	49.26	540	44.06	40.59	4.92	5691	16.06	12.32	12.92	12.13	10.44
4610 (8x2)	1426	Die	8190	3095	3	4.40x4.40	201	2200	52.52	540	46.72	44.51	5.17	6402	16.78	13.17	13.96	13.25	11.60
4610 (8x4)	1427	Die	8230	3085	3	4.40x4.40	201	2200	52.32	540	47.30	43.26	5.62	6534	16.83	13.05	13.53	12.77	11.18
5610 (16x4)	1428	Die	9700	2325	4	4.40x4.20	256	2100	62.54	540	60.58	54.63	5.69	7408	15.57	12.38	12.82	12.44	10.30
5610 (16x8)	1429	Die	9545	3130	4	4.40x4.20	256	2100	62.57	540	59.99	53.7[illegible]	6.57	7578	15.45	12.11	12.93	12.03	10.09
6610 (16x4)	1430	Die	9700	2270	4	4.40x4.40	268	2100	72.13	540	68.27	61.17	5.62	7887	15.64	13.14	13.40	12.90	10.77
6610 (16x8)	1431	Die	9700	2850	4	4.40x4.40	268	2100	72.30	540	69.20	62.64	6.49	7948	15.43	12.91	13.18	12.84	10.87
7610 (16x4)	1432	Die	10800	2220	4	4.40x4.40	268	2100	86.95	1000	86.79	74.22	5.53	8804	15.75	12.44	13.36	12.29	10.35
7710 (16x8)	1433	Die	10800	2150	4	4.40x4.40	268	2100	86.62	1000	86.55	73.24	6.42	8638	15.87	12.60	13.67	12.26	10.35
TW 5	1514	Die	14430	1340	6	4.40x4.40	401	2300	105.74	1000	96.83	95.27	8.52	12249	15.52	12.42	13.14	12.91	11.38
TW 15	1515	Die	16010	2755	6	4.40x4.40	401	2200	121.40	1000	117.83	107.24	8.09	13247	16.90	12.39	13.83	12.80	10.88
TW 15 FWD (1)	1536	Die	16680	2310	6	4.40x4.40	401	2200	121.25	1000	115.58	107.35	5.21	15939	16.95	12.39	13.96	12.65	10.68
TW 25	1516	Die	17965	2530	6	4.40x4.40	401	2200	140.68	1000	135.70	126.[illegible]	5.25	14871	16.66	12.58	13.89	13.02	11.20
TW 35	1517	Die	20270	4090	6	4.40x4.40	401	2200	170.30	1000	166.67	147.49	5.30	17054	17.41	13.81	14.31	13.91	12.18
TW 35 FWD (1)	1537	Die	20270	3130	6	4.40x4.40	401	2200	171.12	1000	162.55	147.55	5.44	18823	17.58	14.09	14.42	13.71	12.04
(1) Drawbar test with front wheel assist engaged																			
Hesston Fiat																			
466 12 Speed	1484	Die	6670	950	3	[illegible]x4.33	158	2600	45.13	540	42.68	40.03	5.79	4969	16.74	12.41	13.66	12.87	10.95
480 8 DT and 480 8 12 & 8 Speed	1385	Die	7805	2485	3	3.937x4.33	158	2600	42.58	540	40.36	37.07	5.07	5265	16.93	12.27	13.34	12.54	10.64
45 66 DT	1579	Die	5400	950	3	3.937x4.528	16[illegible]	2500	39.49	540	37.97	31.74	4.68	4257	16.65	12.11	12.36	11.23	9.46
55 66 DT	1560	Die	6570	1105	3	3.037x4.528	165	2500	45.78	540	44.84	38.74	5.64	4608	16.36	12.77	12.98	12.80	11.27
60 66 DT	1531	Die	7460	1580	3	4.094x4.527	178.8	2500	51.49	540	48.51	45.51	5.53	5515	17.13	13.11	14.19	13.30	11.38
70 66 DT	15[illegible]1	Die	870[illegible]	2015	4	3.937x4.528	220.5	2500	62.72	1000	62.71	54.83	5.69	8320	17.20	13.67	14.64	13.61	11.54
70 90	1562	Die	7775	490	4	3.937x4.527	220.5	2500	62.25	1000	61.94	54.64	5.62	6238	16.52	13.28	14.04	13.46	11.82
80 90	1563	Die	9465	2155	4	4.094x4.527	238.5	2500	70.86	1000	69.25	61.52	5.56	7323	17.43	13.96	14.76	14.09	12.28
100 90	1580	Die	11580	1860	6	3.937x4.527	331	2500	91.52	1000	90.57	78.72	6.35	9911	16.24	12.93	13.62	12.76	10.68
666 12 Speed	1485	Die	8715	2425	4	3.937x4.33	211	2500	62.40	540	60.33	54.31	5.51	6611	17.00	13.00	13.79	13.20	11.73
780 DT and 780 8 Speed	1386	Die	10100	3920	4	4.055x4.33	224	2500	70.57	540	66.67	62.06	7.61	6965	16.71	13.96	13.72	13.86	12.26
80 66 DT	1532	Die	9400	2685	4	4.094x4.527	238.5	2500	70.43	1000	68.91	62.73	5.47	7245	17.22	14.08	14.96	14.21	12.66
1180 DT Turbo	1450	Die	16885	1935	6	4.055x4.33	335	2550	107.48	1000	104.22	93.71	4.37	12905	16.40	12.54	14.16	12.74	10.42
1380 DT, 1380	1409	Die	16995	1795	6	4.055x4.33	335	2400	123.16	1000	123.54	104.97	8.08	13105	16.49	13.30	13.60	13.01	11.62
130 90 DT Turbo	1564	Die	16385	660	6	4.094x4.527	358	2500	107.48	1000	106.80	91.59	4.67	14850	16.43	12.07	13.83	12.17	[illegible].85
140 90 DT Turbo	1533	Die	16425	375	6	4.094x4.527	358	2500	123.35	1000	122.83	105.81	5.05	12687	17.12	13.04	14.40	13.16	11.13
1580 DT Turbo	1451	Die	19060	2460	6	4.528x5.118	494	2200	141.44	1000	136.14	124.15	5.48	15342	17.28	13.49	14.70	13.53	11.47
160 90 DT Turbo	1534	Die	18370	1075	6	4.528x5.118	494	2200	141.71	1000	143.91	122.23	5.32	13848	17.53	13.61	14.38	13.62	11.84
160 90 Powershift	1603	Die	18220	300	6	4.528x5.118	494	2200	142.64	1000	141.40	126.34	4.44	18256	16.69	12.96	13.92	12.93	11.10
1880 DT, 1880	1410	Die	19710	3020	6	4.528x5.118	494	2200	162.48	1000	159.83	138.81	5.44	15656	17.35	13.87	14.53	13.58	12.07
180 90 DT Turbo	1535	Die	19725	2430	6	4.528x5.118	494	2200	162.87	1000	158.66	140.45	6.40	14713	17.86	14.13	14.82	14.25	12.29
180 90 Turbo P.S.	1581	Die	19570	1745	6	4.528x5.118	494	2200	162.15	1000	161.07	143.02	4.43	19734	16.77	13.07	14.03	13.30	11.06
International Harvester																			
284 8 Speed	1387	Die	3600	860	3	3.27x3.94	99	2600	27.47	540	23.92	23.52	5.71	2523	14.40	10.91	10.99	10.53	9.18
786 16 Speed	1388	Die	11930	340	6	3.875x5.0625	358	2400	80.20	1000	77.41	70.25	4.74	9968	15.72	11.40	12.72	11.88	10.00
3088 16 Speed	1551	Die	12500	560	6	3.875x5.062	358	2400	81.35	1000	80.28	71.20	5.16	10995	16.03	11.36	12.84	11.59	9.76
3288	1438	Die	13560	1800	6	3.875x5.062	358	2400	90.46	1000	88.33	80.72	6.11	11486	15.94	11.69	13.16	12.31	10.27
3488 Hydro	1439	Die	13940	1060	6	4.30x5.35	466	2400	112.56	1000	107.11	83.43	6.50	12152	15.28	10.64	10.00	9.73	8.[illegible]3
3688	1440	Die	14335	1135	6	4.30x5.00	436	2400	113.72	1000	112.48	100.28	7.36	12250	15.75	11.82	13.30	12.35	10.38
5088 (2)	1419	Die	16250	240	6	4.30x5.00	436	2400	136.12	1005	136.12	121.17	5.06	14960	15.32	11.65	13.23	12.04	9.90
5288	1420	Die	18585	1530	6	4.30x5.35	466	2400	162.60	1005	162.60	142.37	5.27	17577	16.07	12.62	13.70	12.77	10.75
5488	1441	Die	20005	2765	6	4.30x5.35	466	2400	187.22	1005	187.22	164.82	5.27	18646	16.20	13.00	14.16	13.15	11.21
(1) Serial No. 2490208 U17026 and up. (2) Drawbar information is from test run with radial ply tires																			
Kubota																			
L235	1406	Die	3715	1280	3	3.00x3.23	68	2600	19.59	540	19.63	16.05	4.68	2440	14.33	11.34	11.33	10.85	9.23
L275	1407	Die	4055	1430	3	3.23x3.23	79.3	2600	23.42	540	23.01	19.70	4.84	2717	14.57	11.55	11.62	11.07	9.95
L2250 4WD	1585	Die	3130	530	3	3.23x3.23	79.3	2600	21.15	540	21.45	17.28	5.04	2103	17.18	13.38	13.46	12.36	10.67
L2550 4WD	1586	Die	3850	1100	3	3.35x3.23	85.1	2600	23.98	541	24.24	20.23	5.22	2446	16.52	13.37	13.27	12.39	10.55
L2850 4WD	1587	Die	4580	1615	4	3.23x3.23	105.7	2600	27.51	540	27.96	24.02	5.02	3143	16.98	13.07	13.49	12.68	10.92
L3350 4WD	1588	Die	5340	1155	4	3.35x3.23	113.6	2600	32.86	540	33.29	27.49	4.92	3434	17.13	13.52	13.32	12.78	11.08
L3750 4WD	1555	Die	5945	1530	5	3.35x3.23	142	2500	36.96	540	36.81	30.69	4.96	3641	17.32	13.32	13.29	12.49	10.69
L4150 4WD	1556	Die	6365	1840	5	3.35x3.23	142	2600	40.64	540	40.22	34.50	5.47	4257	17.12	13.24	13.14	12.81	11.07
M4030 DT	1594	Die	7375	2415	6	3.23x3.23	158.5	2600	44.05	540	44.08	36.91	6.02	4005	17.19	13.48	13.80	12.92	11.16
M4050 DT and M4050 8 Speed	1495	Die	7215	2275	6	3.23x3.23	158.5	2600	45.74	540	42.10	37.61	5.99	4259	15.06	11.57	11.67	11.52	9.88

Ten-Year Summary of Test Reports, 1981-1990

MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	ENGINE				Max. PTO HP at Rated Engine RPM	Std. PTO RPM	Max. PTO HP Std. PTO RPM	Max. Draw-bar HP	MPH at Max. Dwbr. HP	Max. Lbs. Pull	FUEL CONSUMPTION (HP Hours Per Gallon) at:-				
					No. of Cyl-inders	Bore and Stroke	Dis-place-ment Cu. in.	Rated RPM							Max. PTO HP at Std. PTO RPM	PTO Average at Varying Power	—Varing Drawbar Power— Max. Avail-able Power	75% of Pull Max. Power	50% of Pull at Max. Power
Kubota																			
M4950 DT & M4950 12 Speed	1496	Die	8195	2395	6	3.35x3.23	170	2600	49.57	540	45.47	41.43	4.68	5292	14.70	11.21	11.49	11.15	9.26
M5030 DT	1595	Die	8120	2985	6	3.35x3.23	170	2600	49.77	540	48.94	42.00	4.90	4592	17.28	13.58	13.72	13.34	11.67
M5950 DT & M5950 12 Speed	1497	Die	9220	3100	3	4.29x4.53	196	2400	58.00	540	52.81	49.29	5.09	5749	17.08	13.44	13.64	13.53	11.83
M6030 DT	1596	Die	8970	3590	3	4.29x4.53	196	2400	57.74	540	53.57	48.11	5.54	5330	16.96	13.32	13.28	13.32	11.68
M6950 DT & M6950 12 Speed	1498	Die	9575	2530	4	4.13x4.53	243	2400	66.44	540	63.96	56.74	5.02	6517	16.98	13.26	13.72	13.28	11.33
M7030 DT	1597	Die	9405	3205	4	4.13x4.53	243	2400	68.87	540	64.38	58.49	5.23	5896	17.43	13.68	14.03	13.80	11.97
M7950 DT & M7950 12 Speed	1499	Die	10305	3205	4	4.29x4.53	262	2400	75.44	540	69.32	65.24	5.26	7244	17.14	13.57	13.88	13.82	11.93
M8030 DT	1598	Die	9970	3640	4	4.29x4.53	262	2400	76.91	540	70.47	64.37	6.97	6503	17.23	13.71	13.70	13.54	11.95
M8950 DT	1557	Die	12270	2540	4	4.29x4.53	262	2400	85.63	1005	85.63	77.13	7.53	7974	16.21	12.91	12.96	12.37	10.36
Long																			
510	1415	Die	8210	3925	3	4.02x4.33	164.5	2400	49.15	540	46.91	43.27	5.14	6040	15.74	13.48	13.15	13.52	12.24
510DTC	1416	Die	9100	3835	3	4.02x4.33	164.5	2400	49.35	540	46.41	41.37	4.63	5635	16.47	13.72	13.68	13.30	11.69
610	1417	Die	8985	4290	4	4.02x4.33	219	2400	64.33	540	60.57	57.48	5.37	7018	15.93	13.46	13.58	13.51	11.92
Massey Ferguson																			
MF 154-4	1411	Die	6920	1615	3	3.60x5.00	152	2250	42.52	540	40.38	35.40	4.52	4144	17.26	13.41	13.79	13.00	11.42
MF 184-4 12 Speed	1392	Die	7775	1395	4	3.875x5.00	236	2200	62.45	540	59.56	52.38	7.13	5500	16.41	12.37	12.61	12.11	10.69
MF 240 8 Speed	1519	Die	4985	770	3	3.60x5.00	152	2000	34.77	540	31.09	29.39	5.30	3824	16.10	13.18	13.72	13.35	11.59
MF 250 8 Speed	1520	Die	5760	1175	3	3.60x5.00	152	2250	40.86	540	36.93	35.07	5.81	4297	15.86	12.38	12.92	12.50	10.72
MF 254 12 Speed	1478	Die	7275	1790	3	3.60x5.00	152	2250	43.36	540	40.71	35.14	5.82	3844	16.58	13.43	12.84	12.51	10.62
MF 270 8 Speed	1521	Die	8195	1295	4	3.875x5.00	236	2000	55.85	540	52.75	47.08	4.96	5896	16.79	12.99	13.44	13.10	11.22
MF 274 12 Speed	1479	Die	8190	2205	4	3.875x5.00	236	2200	55.39	540	54.26	46.76	6.56	4719	17.25	12.80	13.76	12.66	10.59
MF 290 12 Speed	1522	Die	9070	3130	4	3.975x5.00	248	2200	65.92	540	59.37	56.36	6.44	7654	16.58	12.75	13.24	12.76	10.98
MF 294 12 Speed	1480	Die	8645	1925	4	3.975x5.00	248	2100	67.39	540	64.94	56.28	5.77	5665	17.58	14.53	14.68	13.95	12.54
MF 298 8 Speed	1523	Die	11040	3070	4	4.50x5.00	318	2000	79.54	1000	73.66	69.74	5.14	8712	16.31	12.88	13.47	13.14	11.55
MF 298 12 Speed	1524	Die	10950	2935	4	4.50x5.00	318	2000	79.26	1000	74.25	67.85	7.73	8663	15.72	11.93	12.40	12.39	10.79
MF 670 & 270 12 Speed	1538	Die	9200	480	4	3.875x5.00	236	2000	55.62	1000	51.44	46.05	4.87	6382	16.39	12.37	12.93	12.10	10.26
MF 690 12 Speed	1539	Die	10295	2275	4	3.975x5.00	248	2200	65.68	540	62.25	54.78	4.77	7650	15.51	11.96	12.01	11.79	9.82
MF 698 12 Speed	1540	Die	12125	2185	4	4.50x5.00	318	2000	78.83	540	74.41	68.38	4.56	8707	15.91	11.91	12.55	12.24	10.59
MF 699 12 Speed	1541	Die	12935	2610	6	3.875x5.00	354	2200	85.79	540	78.00	71.71	4.69	8718	16.96	12.87	13.51	12.66	10.64
MF 1020	1552	Die	2930	700	3	2.953x3.347	68.7	2350	17.08	540	16.24	14.59	5.01	1771	12.53	10.51	10.36	10.44	9.39
MF 1030	1553	Die	3915	925	3	3.228x3.543	87	2500	23.35	540	22.80	18.66	5.70	2277	12.97	10.31	10.04	9.82	8.30
MF 1040	1554	Die	4715	915	3	3.622x3.937	121.7	2500	27.73	540	25.80	22.57	5.52	2795	12.98	10.01	10.07	9.53	7.84
MF 2640 15 Speed	1481	Die	16380	3945	6	3.875x5.00	354	2400	90.95	1000	87.60	74.83	6.58	10623	15.81	11.67	12.15	11.46	9.70
MF 2775 8 Speed	1389	Die	20170	4365	8	4.63x4.75	640	2600	162.09	1000	146.87	139.68	5.73	16766	15.78	11.19	12.45	11.68	9.56
MF 2805 8 Speed	1399	Die	21430	5395	8	4.63x4.75	640	2500	190.81	1000	186.29	164.58	5.41	17647	16.59	10.97	12.41	11.43	9.58
MF 3505 16 Speed	1511	Die	13195	260	6	3.875x5.00	354	2400	91.50	1000	87.47	74.79	6.54	8344	15.53	11.40	11.55	10.90	9.19
MF 3525 16 Speed	1512	Die	14645	1545	6	3.875x5.00	354	2400	108.01	1000	103.67	91.22	6.45	9322	16.67	11.65	12.65	11.53	9.31
MF 3545 16 Speed	1513	Die	17235	3935	6	3.875x5.00	354	2400	126.72	1000	122.15	105.16	6.82	10563	17.01	12.11	12.86	11.47	9.64
MF 4900 18 Speed	1391	Die	33940	2975	8	5.5x4.75	903	2600	320.55	1000	323.88	278.78	6.53	30090	16.80	11.95	13.26	11.82	9.87
Steiger																			
Bearcat 1000	1592	Die	28575	0	6	4.75x6.00	638	2100	218.00	1001	218.00	195.49	4.45	28566	16.61	13.41	14.68	13.57	11.60
Bearcat III ST 225(1)	1414	Die	30005	464	6	4.75x6.00	638	2100				197.69	5.47	28805			13.99	13.54	11.65
Bearcat IV KM 225	1542	Die	33830	5430	6	4.921x5.354	611	2100				193.11	4.18	31556			16.43	15.28	13.12
Cougar 1000	1593	Die	31270	2820	6	4.75x6.00	638	2100	259.96	1001	259.96	230.18	6.59	30981			15.17	14.31	12.53
Cougar CR 1225	1577	Die	29190	0	6	4.75x6.00	638	2100	208.61	999	208.61	184.83	5.16	29570	16.46	13.29	14.40	13.46	11.44
Cougar CR 1280	1578	Die	29600	0	6	4.75x6.00	638	2100	258.15	999	258.15	231.19	5.19	28708	17.19	14.18	15.18	14.30	12.36
Cougar III ST 250(2)	1452	Die	29965	0	6	4.75x6.00	638	2100				215.98	6.11	29539			15.16	14.40	12.76
Cougar III PTA 280	1402	Die	33675	2895	6	5.50x6.00	855	2100				224.92	5.54	32625			13.74	12.54	10.44
Cougar III PTA 280	1413	Die	33150	2370	6	5.40x6.50	893	2100				236.55	7.07	32085			14.24	13.14	11.19

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HAY AND FORAGE EQUIPMENT EMPHASIS

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, No. 4 APRIL 1991

TW-5 FORD
NEW HOLLAND D1000

THE FORD NEW HOLLAND D1000 baler has become popular to more than commercial hay producers. The company reports that 70 percent of D1000 sales go to owners for use on their farms.

With Interest In Midsize Bales Growing

Several New Balers Vie For Market

By W. THOMAS

THERE'S RENEWED interest in an old standby in the hay business—the rectangular bale.

This time, it's a newer midsize bale that is drawing attention in the marketplace, with several lines competing for the business.

Rectangular bales have been popular for decades because of their ease of handling, storage and feeding. Lack of labor help on the farm has led producers to search for new ways to put up feed easily. While the large round baler offered some labor-saving advantages, there is growing interest in the midsize rectangular baler.

Hesston introduced the first giant rectangular baler in the late 1970s. The company developed a machine that packed as much as 1 ton into the bale chamber, tied it and kicked it out onto the field. The new bale size was 4 x 4 feet and up to 8 feet long.

The stackability of this bale made it popular with commercial hay producers and larger livestock operations in the Midwest and West. In the mid-1980s a smaller bale—3 x 3-feet on the end and weighing about half a ton—came on the scene.

The latest wrinkle in this product class is the midsize rectangular bale that weighs from 800 to 1,000 pounds. You'll find Hesston with its 4700 and 4750 models, Vicon with the MP800, Ford New Holland with the D1000 and now Case IH with the 8570.

(See MIDSIZE, pg. 2)

Case-IH's Ashford Resigns Cites Personal Reasons

By BOB FRAZER

EXPRESSIONS of surprise and disappointment are the usual reaction to news that James K. Ashford has resigned the president and chief executive officer post with Tenneco's JI Case farm equipment unit.

The widely known and respected 54-year-old Ashford is credited with returning the Case division to profitability during his 3-year tenure. His success with

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

APRIL 1991
VOL. 106, NO. 4

IMPLEMENT & TRACTOR
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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years — $30. Single copies, $2.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953 $2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN 0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

EDITOR'S NOTEBOOK

Competition Isn't Always Healthy

By SCOTT NESBITT

WHILE I'D stop short of proposing a farm machinery cartel to set prices, I suspect a lot of people in the industry are getting tired of seeing the big players kick each other so hard that the profits are being knocked out of everyone's pockets.

Item 1: From the annual report of Varity Corp., the owners of Massey-Ferguson, comes the news that sales of equipment grew 4 percent in absolute dollar terms in fiscal 1990, but "Intense competition marked by discount pricing eroded margins, contributing to a decline of 24 percent in operating income."

Item 2: Deere & Co. issued a disappointing annual report that said "Sales incentive costs were substantially higher due to extremely competitive market conditions." That was followed by a first-quarter report that says "First quarter results were also adversely affected by significantly higher sales incentive costs."

Item 3: FEMA, the Farm Equipment Manufacturers Association, surveyed about 1,400 dealers and reported, among other findings, these results: "69 percent of respondents agreed that shortlines provide them with superior margins." Some 68 percent of those surveyed agreed with the statement that "Shortline companies are an important source of competition in the market. Without their competition, the few majors would be able to charge significantly more for equipment."

The list of items could go on for several pages, because farm machinery is, after all, a business, and that implies competition.

What's puzzling is that competition in the farm machinery business seems to lead to lost profits, rather than the stimulation of better ways to do things.

Is there so little difference among competing products that when times get tough, every manufacturer has to use give-aways to move inventory?

In the automotive world, some lines like BMW, Mercedes, Lexus and Infiniti command a premium price because buyers are willing to pay the extra money to own them. It can be argued that many of those auto purchases are made for emotional rather than practical reasons, and that farmers are not subject to those same whims.

Yet every dealer knows farmers who are highly brand-loyal, who will never switch brands. Look at the fuss that arose when Allis-Chalmers went from orange to green under new ownership, and the gladness that has greeted the return to an orange motif under the latest ownership. Do you remember the huge sigh of relief that arose when Case, having purchased International Harvester, revealed that it would keep the deep red color?

Those concerns over machinery color reflect the very human nature of farm machinery buyers. Chances are they would continue buying at fair prices, without the need to give all the profit away when the economy gets a little rough.

It may not be possible to make a direct analogy between the farm machinery business and the auto business, which bases so much of its marketing on emotion and non-tangible motives. But in both industries, the buyers are flesh-and-blood people, and car dealers eagerly seek those high-dollar franchises, because they know they'll have a good chance to make big bucks with those cars. Can the same be said for any major or shortline franchise in the farm machinery business?

The issue for dealers should, ultimately, be whether they can turn a profit, or at least enough profit to let them feel good about themselves. One of the big traps in the industry's loss-through-incentive tradition is that the dealers and their salesmen are often lured into believing they benefit from the programs.

Typically, sales incentive programs will incorporate some kind of "spiff," so the dealer principal and his sales personnel are rewarded for moving inventory. The spiff may be a trip to Hawaii or a cash incentive, a new car or whatever the marketing types feel is a good motivater.

The reward may stimulate the dealer over the short term, but what does it do over the long haul?

Might giveaways serve, in the long term, to teach customers that if they will only wait for the next downturn, they can get new machinery practically for free? Once they learn such behavior, it becomes especially tough to reeducate them to the notion that they need to pay a fair price in exchange for fair value. They must learn to buy machines on merits and when they need them, not only when they are on sale.

The line of thinking above was stimulated during breakfast and trying to catch up on some newspapers, while eavesdropping on a gaggle of farmers in the next booth.

The papers were a bit dull, though I wanted to keep tabs on some formerly Communist countries that are trying to develop market economies based on competition. The farmers, I realized, would have set a terrible example for those East Europeans, because the farmers were doing what they always do—helping their neighbors.

The impromptu breakfast roundtable happened to be held during the preplanting season, so everyone was sharing tips about the results of various varieties, chemicals and planting dates.

I can think of no business other than farming in which a person who scores a success is so eager to run out and reveal his secret to his closest competitor. A man (or woman) who gets an extra 2 bushels of corn off an acre will not only tell his neighbor how he did it, he will go over and spend his own time and resources helping his neighbor duplicate the feat.

You wouldn't see such behavior in the business of making lightbulbs or plywood. The government would probably step in and send everyone to jail if they did such things in the paving business. But in farming, and farm machinery, competition is not defined the same as in the rest of the world.

I am not complaining, because this magazine is 105 years old and has interviewed countless numbers of dealers who gladly spend the time sharing their secrets of success with other dealers who read the magazine—including their competitors right down the road.

A friend who's life is farming once explained that while my observation about farmers and competition was correct, I had missed the point.

"Farmers may be lousy businessmen," he said, "but they're mighty good people."

His explanation may well hold for the major and minor players in the world of farm machinery manufacturing. They may not know how to deal with competition, but they sure know how to treat their customers right. ☐

INDUSTRY UPDATE

Sales: A Casualty of War?

BECAUSE it was mercifully short, the Gulf conflict may have no long-term effect on the farm machinery market. But while it lasted, it apparently clobbered sales, with the exception of combines, which rose nicely in January and modestly in February compared to 1990 results, according to flash reports from the Equipment Manufacturers Institute.

U.S. - UNIT RETAIL SALES

Equipment	January & Year-To-Date 1991	1990	% Change	December 1990 Inventory N.A.Factory & U.S. Field
Farm Wheel Tractors:				
2-Wheel Drive				
Under 40 HP	1,679	2,276	(26.2)	40,795
40 & Under 100 HP	1,911	2,429	(21.3)	25,392
100 HP & Over	1,207	1,720	(29.8)	14,042
Total 2-Wheel Drive	**4,797**	**6,425**	**(25.3)**	**80,229**
Total 4-Wheel Drive	**171**	**320**	**(46.6)**	**2,445**
Total Farm Wheel Tractors	**4,948**	**6,745**	**(26.3)**	**82,674**
Combines (Self-Propelled)	645	504	28.0	5,189

U.S. - UNIT RETAIL SALES

Equipment	February 1991	1990	% Change	January-February 1991	1990	% Change	January 1991 Inventory N.A.Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	1,528	2,176	(29.8)	3,233	4,452	(27.4)	41,063
40 & Under 100 HP	1,976	2,296	(13.9)	3,881	4,725	(17.9)	25,686
100 HP & Over	1,450	1,602	(9.5)	2,656	3,322	(20.0)	13,878
Total 2-Wheel Drive	**4,954**	**6,074**	**(18.4)**	**9,770**	**12,499**	**(21.8)**	**80,627**
Total 4-Wheel Drive	**193**	**327**	**(41.0)**	**364**	**647**	**(43.7)**	**2,457**
Total Farm Wheel Tractors	**5,147**	**6,401**	**(19.6)**	**10,134**	**13,146**	**(22.9)**	**83,084**
Combines (Self-Propelled)	425	480	(11.5)	1,069	984	8.6	5,427

WHO'S WHO

Kohler Co., Kohler, Wis., has named **Robert Leffel** as director of marketing, sales and service, and **Charles Vrba** as director of reliability and program management in the engine division.

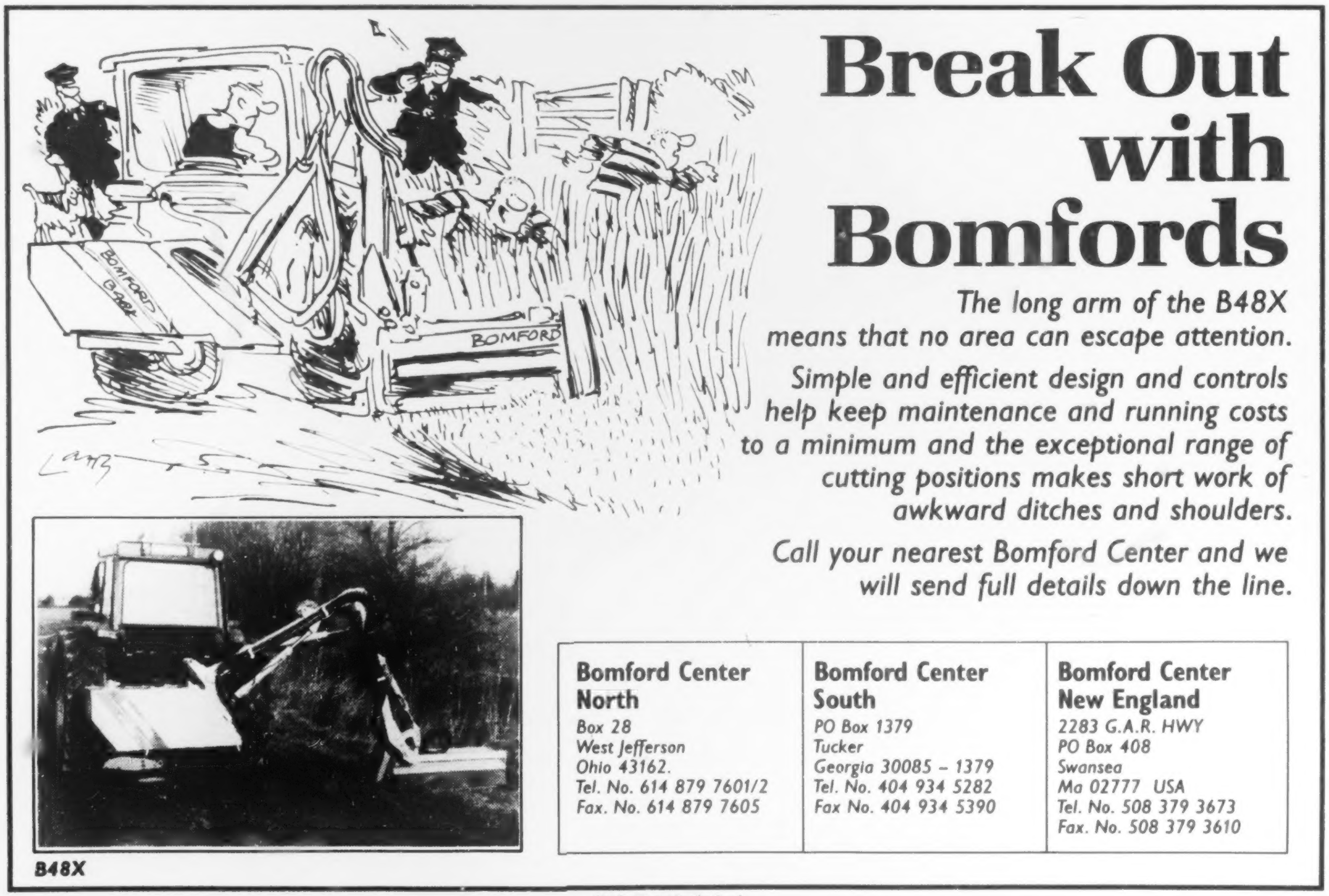
Leffel had been director of sales and service, and will now oversee all marketing, product management, promotions and advertising. Vrba will be responsible for the quality of engines and timely product introductions.

****

Homelite Division of Textron, Inc., has a new president, **Robert W. Reid**, the former president of the Jacobsen division of Textron. He succeeds Robert D. Batting, who had been acting Homelite president since November, 1990. Batting, president of Homelite from 1985 to early 1989, is a group vice president of Textron. The personnel actions were announced by Beverly F. Dolan, president and CEO of Textron.

****

Interstate Battery System of America, Inc., Dallas, Texas, has promoted **Thomas "Tommy" Miller** to president and chief executive officer. He had been vice president since 1978, and is a 28-year veteran of the battery business.



Break Out with Bomfords

The long arm of the B48X means that no area can escape attention.

Simple and efficient design and controls help keep maintenance and running costs to a minimum and the exceptional range of cutting positions makes short work of awkward ditches and shoulders.

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B48X

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INDUSTRY NEWS

Varity Corp Has Net Income Rise

Varity Corp., parent of Massey-Ferguson, reported its net income increased 10 percent, to $101.5 million (U.S.), in the corporation's latest fiscal year, which ended Jan. 31, 1991.

The company said the results, second highest in the firm's 144 years, came after absorbing a nonrecurring pre-tax charge in the third quarter of $15.5 million, and a fourth-quarter provision of $18 million. Fully diluted earnings per share of 30 cents were equal to last year's result.

Varity said it saw a strong performance from it's newly acquired Kelsey-Hayes automotive components group, and improved earnings from Perkins diesel engines.

These balanced weakened results in Massey-Ferguson farm machinery, which experienced a half-point growth in market share and 4 percent sales growth, to $1.3 billion. However, the gain melted away because changing currency values equated to a drop of nearly 7 percent overall. Intense competition marked by discount pricing was blamed for eroding margins, contributing to a 24 percent decline in operating income, to $70 million. ☐

Gehl Co. Posts Record Results

Gehl Co. said net income was $7.3 million for 1990, a gain of 45 percent from the $5 million posted in 1989. Sales were $175 million, up 13 percent from 1989. Earnings per share for 1990 were $1.21.

The company said agricultural division sales were up 16 percent, to $132.6 million, while the industrial/construction was up 4 percent, to $42.3 million.

Gehl also announced in late February a quarterly dividend of 4 cents per common share. ☐

New Finance Arm For Deutz-Allis

Deutz-Allis Corp. has established a new captive subsidiary as a dedicated finance source for the company's retail dealers.

The new AGCO Farm Finance Corp., began processing business in January. It takes its name from the farm machinery line's new holding company, Allis-Gleaner Corp., also known as AGCO.

Bernard Doepker, president of the new company, said it will offer 24-hour response to credit application and programs that are competitively priced. ☐

Chase Takes Over Allied Financing

Allied Products Corp., parent of White-New Idea and other lines of farm machinery, has announced sale of a "substantial portion" of its Allied Products Financial Services Corp. to Chase Manhattan Leasing Co. (Michigan).

Chase Leasing President John Unchester said Chase would provide retail financing services to support sale of Allied agricultural equipment through White and New Idea dealers. He noted that Chase already serves nearly 100 of the dealers.

The price for Allied's consolidated finance subsidiary was put in excess of $17 million. Chase, headquartered in Paramus, N.J., said the portfolio included more than 2,400 contracts for Allied agricultural equipment.

Allied president and CEO Richard A. Drexler said the sale "will assure the existing financial relationship with our network of agricultural equipment dealers will continue in a professional and capable manner." Sale proceeds, he said, would be used to pay down virtually all debt of the subsidiary. ☐

Steiger Tractor Creator Dies

Maurice Steiger, 62, who helped found the Steiger Tractor Co., died March 17 in the crash of a twin-engine plane in dense fog near Thief River Falls, Minn. Also killed were his sons, Bruce, 41, Brad, 33, and a friend, Dennis Hallstron, 52.

The Steiger line, now absorbed into Case-IH, began with homemade 4wd machines built in 1958 by Maurice Steiger and his brother Douglass. They began manufacturing in 1959, and sold control to investors in 1969. Their machines helped change farming forever.

Police said the airplane, piloted by Maurice, may have hit a telegraph line and spun out of control on its approach to the airport at Thief River, where all the victims lived. ☐

Associations Merge In Wisconsin, Illinois

Effective Sept. 1, a new Midwest Equipment Dealers Association will be created, merging the current Illinois Retail Farm Equipment Association and the Wisconsin Farm Equipment Association.

Many details remain to be worked out by joint committees. The 2 state associations held their fourth consecutive joint session last December, and approved the merger then.

Primary offices will be in Madison, Wis., with a major branch office in Springfield, Ill.; both are capital cities. IRFEA executive vice president Vic Zoschak will remain with the merged group until his retirement Sept. 1, 1992. ☐

'Rebuild Kuwait' Is Theme of Show

Proclaiming that "The Gulf Region is once again open for business," a consortium of U.S. and foreign firms and governments have organized a trade show called "Made In The U.S.A.—The Products and Services of America."

The show, for U.S. companies only, is to be held May 13 to 17 at the Dubai World Trade Center. Information is available from Glahe International Inc., 1700 K. Street N.W., Washington, D.C., 20006-3824. Phone 202-659-4557. ☐

Contraction Seen In Canadian Market

FARM machinery sales remained weak in Canada, with figures from the Canadian Farm and Industrial Equipment Institute showing full-year 1990 sales down 7.6 percent from 1989 figures. The report for January, the first full month available at deadline, showed 1991 getting off to a miserable start.

Canada Report Retail Sales In Units

	December			December/YTD		
EQUIPMENT	1990	1989	% Chg.	1990	1989	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	215	243	-11.5%	3,574	3,950	-9.5%
2WD 40-99 H.P.	852	894	-4.7%	7,228	7,865	-8.1%
2WD 100 H.P. & Over	326	331	-1.5%	2,602	2,957	-12.0%
Total 2WD	1,393	1,468	-5.1%	13,404	14,772	-9.3%
Total 4WD	97	120	-19.2%	1,585	1,456	8.9%
TOTAL FARM WHEEL TRACTORS:	1,490	1,588	-6.2%	14,989	16,228	-7.6%
COMBINES						
Self Propelled	84	124	-32.3%	1,404	1,637	-14.2%
Pull Type	10	14	-28.6%	184	631	-70.8%

Canada Report Retail Sales In Units

	January			January/YTD		
EQUIPMENT	1991	1990	% Chg.	1991	1990	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	158	199	-20.6%	158	199	-20.6%
2WD 40-99 H.P.	367	530	-30.8%	367	530	-30.8%
2WD 100 H.P. & Over	125	184	-32.1%	125	184	-32.1%
Total 2WD	650	913	-28.8%	650	913	-28.8%
Total 4WD	70	147	-52.4%	70	147	52.4%
TOTAL FARM WHEEL TRACTORS:	720	1,060	-32.1%	720	1,060	-32.1%
COMBINES						
Self Propelled	42	58	-27.6%	142	58	-27.6%
Pull Type	1	10	-90.0%	1	10	-90.0%

DOUGLAS Rotary Tillers

Manufactured right here in North America, DOUGLAS Rotary Tillers feature automatic chain tighteners, splined shafts and an advanced 3 pt hitch assembly for easier hook up and more versatility in adjusting working depth to match soil conditions and tillage job required. "Side Shift" is also standard on most models.

DOUGLAS MANUFACTURING
Winkler, MB R6W 4C2
PH: (204) 325-4561

DOUGLAS Finishing Mowers

If you've got more yard than time but still want a manicured lawn DOUGLAS Finishing Mowers are for you. With 3 blades, 4 wheels plus front roller and a new 1 piece 3/16" plate steel deck you'll have that professionally cut look you're after in no time flat. And with new heavier gear boxes, larger pulleys and a new spindle with heavier bearings your DOUGLAS Finishing Mower is built to keep on cutting, even when used for rough cutting around outbuildings.

DOUGLAS MANUFACTURING
Winkler, MB R6W 4C2
PH: (204) 325-4561

						ENGINE									FUEL CONSUMPTION (HP Hours Per Gallon) at:-				
																	—Varing Drawbar Power—		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM	Max. PTO HP at Rated Engine RPM	Std. PTO RPM	Max. PTO HP Std. PTO RPM	Max. Drawbar HP	MPH at Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP at Std. PTO RPM	PTO Average at Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull at Max. Power
Cougar III ST 280	1401	Die.	33105	2625	6	5.50x6.00	855	2100	---	---	---	236.82	5.37	31517	---	---	14.55	13.20	11.05
Cougar III ST 280	1412	Die.	33345	2705	6	5.40x6.50	893	2100	---	---	---	246.13	6.28	32099	---	---	14.85	13.76	11.69
Panther IV KM 325	1543	Die.	33715	3955	6	5.50x6.00	855	2100	---	---	---	285.67	6.78	32565	---	---	16.04	14.79	13.00
Panther IV CM 360	1544	Die.	33740	3815	6	5.40x6.50	893	2100	---	---	---	[illegible].84	6.73	32328	---	---	15.96	15.15	13.29
Panther IV SM 325	1550	Die.	33930	5030	6	4.921x5.906	674	2100	---	---	---	278.09	6.78	33651	---	---	17.12	15.98	14.22
Panther CP 1325 12 Speed	1453	Die.	35870	410	6	5.40x6.50	893	2100	299.10	1002	299.10	266.97	6.95	33802	16.55	13.59	14.71	13.86	11.95
Panther CP 1360 12 Speed	1455	Die.	39120	3860	6	5.40x6.50	893	2100	334.33	1002	334.33	294.07	6.89	36123	16.75	13.78	14.60	13.81	11.85
Panther CP 1400 12 Speed	1464	Die.	43615	7165	6	5.40x6.50	893	2100	---	---	---	334.94	8.17	40272	---	---	14.92	14.12	12.07
Panther KP 1325 12 Speed	1465	Die.	35815	605	6	5.50x6.00	855	2100	301.21	1002	301.21	267.87	6.93	34267	17.38	13.97	15.58	14.15	11.84
Panther KP 1360 12 Speed	1456	Die.	39570	4090	6	5.50x6.00	855	2100	326.12	1002	326.12	291.14	6.92	36771	17.39	14.15	15.45	14.27	12.15
Panther KP 1400 12 Speed	1463	Die.	43175	6640	6	5.50x6.00	855	2100	---	---	---	333.18	4.82	40803	---	---	15.87	14.54	12.10
(1) SN. 109 00328 and higher. (2) SN. 104-00331 and higher. (3) Equipped with hydrostatic PTO 105HP at 1000 RPM.																			
Valmet																			
980 4x4	1599	Die.	13265	5000	4	4.01x4.72	239	2300	88.01	540	80.55	78.04	6.71	10722	18.23	13.14	14.35	13.19	11.26
148 4x4	1600	Die.	16830	5920	6	4.01x4.72	359	2300	126.89	1000	127.11	110.09	4.94	13574	16.92	13.63	14.29	13.29	11.71
Versatile																			
256 Hydrostatic	1518	Die.	10460	1310	4	4.02x4.72	239	2500	84.36	540	85.08	62.81	5.49	9134	16.45	12.67	11.82	11.07	9.52
276 Hydrostatic	1565	Die.	10510	1310	4	4.02x4.72	239	2500	100.22	540	102.14	70.91	5.61	7892	16.50	12.86	11.37	10.25	8.63
835 Series 3 12 Speed SN. 835-83-036769 & higher	1482	Die.	27980	3595	6	5.50x6.00	855	2100	200.30	1009	200.30	181.14	5.34	25687	15.82	11.86	14.45	12.74	10.45
836 Manual	1566	Die.	25960	1300	6	4.921x5.354	611	2100	192.54	1008	192.54	170.56	4.83	24123	17.71	13.80	15.59	14.11	11.99
836 Powershift	1567	Die.	25995	1535	6	4.921x5.354	611	2100	181.04	997	181.04	161.45	6.77	24723	16.65	12.56	14.80	13.34	11.24
856 Powershift	1568	Die.	28000	2920	6	4.921x5.354	611	2100	209.28	997	209.28	184.04	5.88	26479	17.24	13.22	15.35	13.59	11.40
875 Series 3 12 Speed SN. 875-83-057906 & higher	1483	Die.	29500	3870	6	5.50x6.00	855	2100	252.67	1008	252.67	227.48	5.65	26725	16.82	13.06	15.25	13.73	11.82
876 Manual	1569	Die.	29500	4540	6	4.921x5.354	611	2100	---	---	---	233.92	6.53	27703	---	---	16.85	15.68	13.65
936 Manual	1570	Die.	32385	5260	6	5.50x6.00	855	2100	---	---	---	260.45	6.78	29495	---	---	15.47	14.04	12.09
1150 8 Speed	1462	Die.	46500	11360	6	6.25x6.25	1150	2100	---	---	---	400.29	5.92	43219	---	---	15.84	14.64	12.35
White																			
2-45 20 Speed	1395	Die.	6630	660	4	3.858x3.62	169.3	2250	43.73	540	36.62	37.32	3.97	4455	12.70	11.25	10.96	11.00	9.66
2-55 16 Speed	1466	Die.	7055	860	4	4.02x3.94	199.4	2200	53.32	540	45.74	48.49	4.88	5037	14.89	12.38	13.35	13.21	11.39
2-62 20 Speed	1396	Die.	6875	635	4	4.016x4.33	219	2200	61.46	540	54.25	51.63	6.05	4695	16.31	13.85	13.76	13.49	12.08
2-65 16 Speed	1467	Die.	7110	790	4	4.02x4.65	235	2200	62.50	540	55.40	56.67	6.51	4827	16.19	12.91	13.94	13.20	11.29
2-75 16 Speed	1486	Die.	9625	1705	6	4.016x4.33	329	2200	75.39	1000	75.64	65.05	6.04	6487	15.86	12.02	13.01	12.21	10.48
2-88 18 Speed	1487	Die.	13615	0	6	3.875x5.00	354	2200	86.78	1007	86.78	74.67	6.51	9486	15.71	12.69	13.62	12.74	10.79
60 18 Speed	1636	Die.	8855	315	4	4.02x4.72	239	2200	61.07	540	61.61	52.39	3.88	7762	14.80	11.83	12.48	11.93	9.84
80 18 Speed	1637	Die.	11340	1990	4	4.02x4.72	239	2200	81.48	994	81.48	71.01	3.83	10091	16.83	13.37	14.04	13.15	11.09
100	1614	Die.	14485	545	6	4.02x4.72	359	2400	94.36	1000	93.48	82.57	5.97	13629	14.97	11.86	12.77	11.88	10.15
2-110 18 Speed	1468	Die.	13955	0	6	3.875x5.00	354	2200	110.52	1007	110.52	94.90	6.40	9500	16.77	13.27	14.19	13.08	10.84
120	1615	Die.	15315	850	6	4.02x4.72	359	2200	119.13	1000	121.94	104.69	6.62	14286	16.94	13.11	14.76	13.57	11.49
140	1616	Die.	15665	1000	6	4.02x4.72	359	2200	138.53	1000	140.30	125.01	6.17	15060	17.49	14.29	15.39	14.58	12.62
160	1607	Die.	18850	1560	6	4.49x5.32	504.5	2200	162.47	1000	165.97	142.74	6.24	18055	17.78	14.36	15.45	14.34	12.29
185	1608	Die.	18770	1620	6	4.49x5.32	504.5	2200	187.55	1000	192.38	167.72	6.18	18318	17.35	14.19	15.21	14.34	12.40
4-225	1558	Die.	24140	0	8	4.50x5.00	636	2600	195.65	1002	195.65	170.57	5.47	22865	15.60	12.06	13.64	12.42	10.44
4-270	1559	Die.	30650	0	6	4.75x6.00	638	2100	239.25	1000	242.30	211.70	6.60	27180	16.69	13.60	14.53	13.53	11.90
Yanmar																			
YM226D	1442	Die.	3380	1080	3	2.95x3.35	68.7	2600	19.42	540	17.87	16.14	4.78	2073	15.07	11.67	11.92	10.93	9.26
YM276D	1443	Die.	4110	1405	3	3.31x3.35	86.2	2600	23.00	540	22.82	18.93	5.78	2412	14.35	11.06	11.08	10.57	8.90
YM336D	1444	Die.	5020	1615	3	3.31x3.54	91.3	2600	26.98	540	25.63	23.00	6.28	3086	14.27	11.32	11.39	10.66	9.64
Zetor																			
5245/5211	1571	Die.	7295	385	3	4.02x4.33	164.6	2200	42.51	540	40.10	38.44	5.79	5955	16.56	13.17	14.59	13.83	12.10
6245/6211	1601	Die.	8535	885	4	3.94x4.33	211	2200	53.09	540	50.23	47.43	5.57	6332	16.06	13.04	13.84	13.34	11.50
7245/7211	1572	Die.	8565	725	4	4.02x4.33	219	2200	58.28	540	54.91	52.52	5.95	6356	16.82	13.51	14.36	13.90	12.33
7745/7711	1602	Die.	10360	2455	4	4.02x4.72	239	2200	65.74	540	62.17	57.56	6.63	7484	17.01	13.94	14.30	13.72	12.05

C3450-1

MEETING THE SOIL COMPACTION CHALLENGE

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, No. 5 MAY 1991

Major Industry Shifting Underway To Let Fiat Buy Ford New Holland

By SCOTT NESBITT

MAJOR shakeups are taking [illegible]ce in the farm mac[illegible] business to let Fiat of Italy [illegible] percent interest in Ford New Holland from Ford Motor Co.

3

A complex game of corporate musical chairs was taking place in late April to set up the purchase. If everything falls into place and meets approval of federal authorities, here are the major changes:

*Fiat Geotech S.p.A., a division of Italian industrial giant Fiat Group, would sell off its Hesston hay machinery division. This relieves U.S. Justice Department worries that Fiat would control too much of the nation's hay business if it owns both Hesston and Ford New Holland.

*Fiat would continue importing its Italian-built tractors for U.S. dealers who want them.

*Allis-Gleaner Corp. would take over Fiat's position as distributor of the Hesston line of balers, mowers, rakes and related field equipment. This key element in the game was contained in a "memorandum of understanding" announced on April 16. Final details were still under negotiation as *I&T*'s publication deadline approached.

*Allis-Gleaner would also take over from Fiat as half-owner of Hay & Forage Industries, the joint venture factory in Hesston, Kan., that builds hay machinery for both Hesston and the other half-owner, the J I Case division of Tenneco, Inc., which sells the Hesston-built haying machines through Case-International dealers.

*Deutz-Allis, the chief subsidiary of Allis-Gleaner, has already dropped its own hay machinery line, which was built by Deutz-Fahr, of Germany.

*Memo Industrial Planning, Inc., has become U.S. distributor of the German-built Deutz-Fahr hay machinery line. Memo continues importing Memo tractors, which are built in Yugoslavia under an agreement with Klockner-Humboldt-Deutz, the parent company of Deutz-Fahr and former owner of Deutz-Allis.

*Klockner-Humboldt-Deutz will continue building, in Germany, a

(See FIAT, pg. 3)

MIKE HOLLEMAN STRESSES customer service and top quality equipment at Right of Way Equipment Company in Cary, N.C. Story on page 18.

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

MAY 1991
VOL. 106, NO. 5

IMPLEMENT & TRACTOR
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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years — $30. Single copies, $2.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953 $2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined November/December issue, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

FIAT

(From pg. 1)

newer generation of tractors than the ones Memo sells. These German tractors will still be sold in the U.S. through the Deutz-Allis dealer network, which also sells some larger tractors assembled in Coldwater, Ohio., by Allied Products at its White-New Idea operation.

Confused?

Here's the reaction in the waning days of April from Case-International spokesman Richard James, whose company is supposed to get a new joint-venture partner for the Hesston hay tool factory:

"We have no confirmation that the Ford-Fiat thing or the Deutz-Fiat thing is complete. We're still waiting for official word, and until we see how its structured, we can't say a thing yet. To our knowledge, its still just a memo of understanding (between Fiat and Allis-Gleaner.)"

While the shuffling of ownerships has benefits for several of the manufacturers involved, it's certain to cause some confusion at the dealer-customer level, where the concern is not only who sells what, but who bears responsibility for product warranty and service parts.

Fiat's spokesman for the United States, Gualberto Rainieri, said he understood that once Fiat disposed of its Hesston hay interests, the Justice Department would remove anti-trust objections to Fiat buying 80 percent interest in Ford New Holland's worldwide operations.

Upon buying FNH, he said, Fiat plans to set up a new company with headquarters in London, England, and 3 operating divisions to target North America, Europe and South America and the rest of the planet. He said the new company's name will be announced upon completion of the FNH purchase.

Rainieri said dealers and consumers should not see an immediate difference in the operation, as the FNH and FiatAgri dealership operations will remain independent in their various markets around the world.

"In due course," he said, there will be integration of purchasing and shared development of new products to "take advantage of synergies and scale and so forth."

While FiatAgri would back away from the Hesston hay operation, it would retain control of its Woods Brothers manufacturing operation, based in Oregon, Ill., which makes and distributes tow-behind brush cutters, mid-mounted tractor mowing decks, and commercial-grade finish, walk-behind and riding mowers.

"The only way we're affected," said Woods Brothers advertising manager Jack Steinhour, "is that we'd no longer be a division of Hesston."

He noted that Hesston bought Woods in 1969, and Fiat bought 51 percent of Hesston in 1977, then took 100 percent control in 1986.

Rainieri said Fiat's new "Winner" series tractors, heavily redesigned in the last year, would not immediately become part of the Ford New Holland product lineup in North America.

"Fiat will remain in control of the tractor product line," he said. He could not, however, provide details of how that would work, given that existing Hesston dealers would be tied in with Allis-Gleaner Corp., with its rival Deutz-Allis tractor line.

The Fiat tractor line, while popular in Europe and elsewhere in the world, has historically been weak in the North American market. According to figures provided to I&T last year by a Ford Motor Co. spokesman, Fiat sold only 1,487 tractors in North America in 1989, a tiny fraction of the 55,287 tractors Fiat sold worldwide that year, or the 120,000-plus tractors sold on this continent that year.

For Deutz-Allis dealers, the Allis-Gleaner Corp. acquisition of Hesston hay equipment may, or may not, fill a gap in the product line that began to develop with the decision last November to stop handling the Deutz-Fahr hay tool line.

James M. Seaver, Deutz-Allis vice-president of marketing, said the Deutz-Fahr line, sold under the "Greenland" label, was dropped before the opportunity came along to pick up the Hesston product line.

"Frankly," he said, "the decision was based on the weak dollar and the high price of the product coming from Germany. We felt we could not keep carrying that product line."

There are no plans, he said, for a green (or orange)-painted Hesston-built product to be put on the market as a Deutz-Allis hay tool line.

"As to the dealership networks," Seaver said, "We will keep Hesston and Deutz-Allis as separate agreements. We will only offer Hesston to a Deutz-Allis dealer if there is no area of conflict with an existing Hesston dealer, and vice versa. It will be business as usual.

"The Hesston product will carry the Hesston name and color, although we might take off the FiatAgri decals from some product that's already out there."

While Allis-Gleaner and Deutz-Allis may have terminated the relationship with Deutz-Fahr, Seaver said that the company will uphold its responsibility to supply service parts for machines already sold and for the "substantial" inventory of haying equipment currently in dealer and company hands.

He gave no specifics, but indicated that inventory would be cleared out at bargain prices.

That unsold hay product from Deutz-Fahr will apparently compete for sales with new Deutz-Fahr hay machinery brought in by Memo Industrial Planning, Inc., in Southlake, Texas, a Dallas suburb.

Mike Simpkins, Memo's sales manager, said his firm became the Deutz-Fahr distributor for the United States as of April 1.

"Setting up a dealer network, or supplying product to dealers who handled the product in the past as Deutz-Allis dealers, is all up to us to arrange," Simpkins said. "Our only arrangement is with Deutz-Fahr for product, not for any dealer contracts."

Simpkins said he has been satisfied with sales over the last 5 years of the Yugoslavian-built, Deutz-designed Memo tractors, but said the supply of product has in recent months been disrupted by political turmoil in the Eastern bloc.

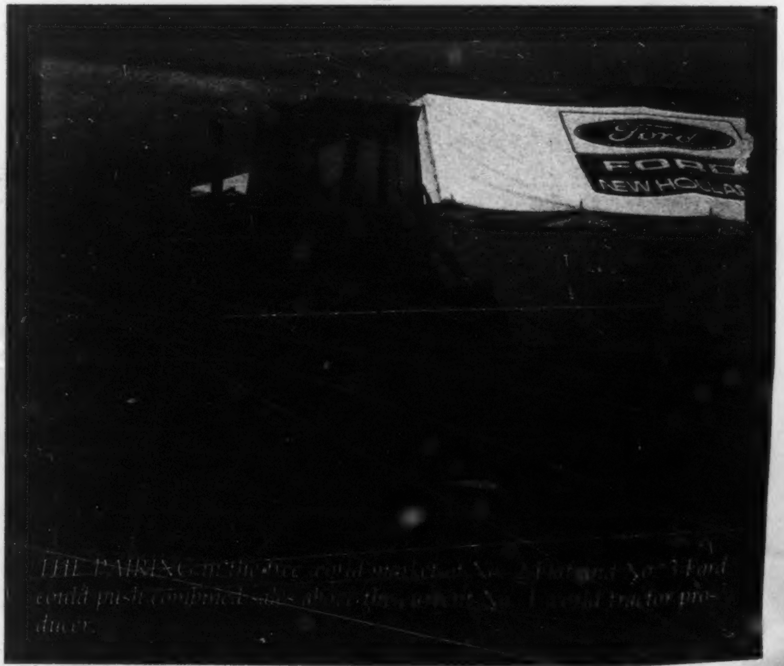
No prices have been released for any of the transactions.

A press release from Deutz-Allis noted that Robert J. Ratliff, president and chief executive officer, has disclosed that the Hesston purchase was a cash transaction, but did not disclose the amount.

The press release noted that Hesston Corp., excluding Woods and Fiat products, reported annual sales in excess of $100 million on its major farm products, including round and square balers, mower conditioners, self-propelled windrowers, forage harvesters and related equipment.

A Ford Motor Co. press spokesman said the car maker would have no comment on Fiat's proposed sale of Hesston, and could not project when the Fiat-Ford deal might be consummated. But he said his sense is that "once the Hesston situation is

(See FIAT, pg. 23)



THE PAIRING [illegible] could [illegible] No. 3 Ford could push combined [illegible] No. 1 [illegible] tractor producer.

INDUSTRY UPDATE

J I Case Loses $147 Million In First Quarter

TENNECO, Inc., has reported a loss of $147 million in the first quarter of 1991 for its J I Case farm and construction machinery division.

"In response to the lower industry demand, Case has significantly reduced production to balance inventories and has taken action to scale down its operations," said a Tenneco report issued April 30. No specifics were given as to plans of personnel cuts, but the company did say that "workforce reductions in Europe resulted in a 1-time charge of $32 million."

Tenneco said that in the first quarter of 1990, the Case division had operating income of $49 million, some $196 million above the 1991 first-quarter results. A spokesman from the corporate headquarters in Houston noted that the 1990 figures included some gain from $15 million of Case's half-interest in Intertractor, a German producer of equipment for tracked vehicles.

A Case spokesman said first-quarter 1991 sales were $949 million, compared to $1.2 billion in the first quarter of 1990. He said a 20 percent cut, on average, was planned in 1991 production for the agricultural and construction machinery lines. A recent report on the Case division reported full-year 1990 sales of $5.4 billion, with operating income of $186 million, and full-year 1989 net sales of $5 billion and operating income of $228 million.

Tenneco chairman and CEO James L. Ketelsen said recession in the first quarter had hit the conglomerate's divisions in chemicals and containerboard products, along with the farm and construction equipment. On the positive side, he said "the performance of our automotive parts and minerals business, while essentially unchanged from 1990, was good, considering economic conditions. The pipeline and shipbuilding businesses, which reported improved earnings for the quarter, continue to be recession resistant."

First-quarter results for Tenneco overall were a loss of $3 million on net sales and revenues of $3.331 billion in 1991, compared to net income of $130 million on net sales and revenues of $3.602 billion in 1990.

Commenting on Case, the nation's No. 2 farm machinery builder, the Tenneco report said:

"The decline in both residential and commercial construction and reduced customer demand for new farm equipment have resulted in lower overall industry demand in the farm and construction equipment business."

"In response to the lower industry demand, Case has significantly reduced production to balance inventories and has taken action to scale down its operations. These actions contributed to the unfavorable first quarter 1991 results, but should benefit future periods."

"The recent gain in strength of the U.S. dollar against major European currencies, beginning late in the first quarter, should also have a positive effect on Case's future earnings."

Ketelsen was quoted as saying "the first quarter results at Case are very disappointing, but they are in line with expectations based on the significant industry downturns in the construction and farm equipment markets." □

DOUGLAS Rotary Tillers

Manufactured right here in North America, **DOUGLAS** Rotary Tillers feature automatic chain tighteners, splined shafts and an advanced 3 pt hitch assembly for easier hook up and more versatility in adjusting working depth to match soil conditions and tillage job required. "Side Shift" is also standard on most models.

DOUGLAS MANUFACTURING
Winkler, MB R6W 4C2
PH: (204) 325-4561

DOUGLAS Finishing Mowers

If you've got more yard than time but still want a manicured lawn **DOUGLAS** Finishing Mowers are for you. With 3 blades, 4 wheels plus front roller and a new 1 piece 3/16" plate steel deck you'll have that professionally cut look you're after in no time flat. And with new heavier gear boxes, larger pulleys and a new spindle with heavier bearings your **DOUGLAS** Finishing Mower is built to keep on cutting, even when used for rough cutting around outbuildings.

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Circle (4) on Reply Card

Flash Report

Spring Sales Start Slowly

SALES OF tractors in the 100-hp-plus range perked up slightly in March, like a shy crocus pushing its head above winter's last snow. Other than that 10.1 percent uptick, the latest flash report of U.S. unit retail sales from the Equipment Manufacturers Institute showed the overall market trailing last year's results for the month and for the first quarter. Inventories for February were slightly above January levels, as is traditional in preparation for the major spring sales season. □

U.S. - UNIT RETAIL SALES

	March			January-March			February 1991 Inventory
Equipment	1991	1990	% Change	1991	1990	% Change	N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	2,911	3,816	(23.7)	6,112	8,268	(26.1)	42,077
40 & Under 100 HP	3,269	3,476	(6.0)	7,132	8,201	(13.0)	26,279
100 HP & Over	2,975	2,702	10.1	5,631	6,024	(6.5)	14,286
Total 2-Wheel Drive	**9,155**	**9,994**	**(8.4)**	**18,875**	**22,493**	**(16.1)**	**82,642**
Total 4-Wheel Drive	**460**	**484**	**(5.0)**	**824**	**1,131**	**(27.1)**	**2,750**
Total Farm Wheel Tractors	**9,615**	**10,478**	**(8.2)**	**19,699**	**23,624**	**(16.6)**	**85,392**
Combines:							
(Self-Propelled)	584	618	(5.5)	1,654	1,602	3.2	5,924

These data are, in part, estimates which are subject to revisions when final detail data become available. Because of the seasonal nature of the industry comparisons of monthly data from one period to another should be done with extreme caution. These data represent most, but not all, of the manufacturers in each product category being sold at retail in the fifty states and the District of Columbia.

Canadian Sales Report: Grim

CANADIAN farm machinery sales in March, and for the year's first quarter, were in serious decline, according to figures from the Canadian Farm & Industrial Equipment Institute. The only bright spots seen in March were a small upturn in 4WD tractor sales, compared to March, 1990, and upticks in forage harvesters and mower conditioners for the first 3 months. □

Canada Report
Retail Sales In Units

		March			March/Ytd	
EQUIPMENT	1991	1990	% Chg.	1991	1990	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	83	237	-65.0%	315	620	-49.2%
2WD 40-99 H.P.	455	492	-7.5%	1,067	1,340	-20.4%
2WD 100 H.P. & Over	214	263	-18.6%	444	568	-21.8%
Total 2WD	**752**	**992**	**-24.2%**	**1,826**	**2,528**	**-27.8%**
Total 4WD	**111**	**109**	**1.8%**	**219**	**396**	**-44.7%**
TOTAL FARM WHEEL TRACTORS:	**863**	**1,101**	**-21.6%**	**2,045**	**2,924**	**-30.1%**
COMBINES						
Self Propelled	38	55	-30.9%	111	153	-27.5%
Pull Type	1	4	-75.0%	5	15	-66.7%
BALERS						
Rectangular Balers	31	33	-6.1%	78	111	-29.7%
Round Balers	102	117	-12.8%	235	284	-17.3%
SWATHERS						
Self Propelled	8	23	-65.2%	20	57	-64.9%
Pull Type	5	18	-72.2%	26	49	-46.9%
FORAGE HARVESTERS						
Shear Bar Type	16	20	-20.0%	55	51	7.8%
MOWER CONDITIONERS	**91**	**92**	**-1.1%**	**237**	**231**	**2.6%**

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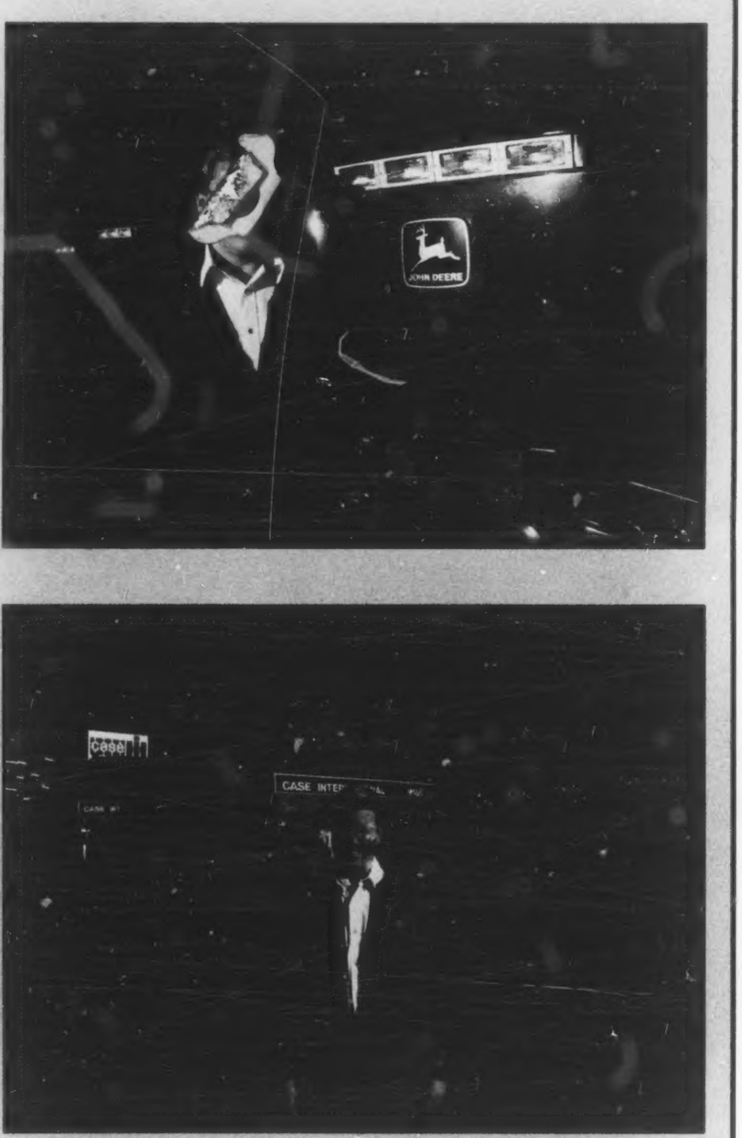
Lawn And Garden Expo • Industry Show Calendar

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, NO. 6

JUNE-JULY 1991



DAVE CHANDLER, top photo, general manager, R.D. Offutt, Casselton, N.D., and Dave Meyer, bottom, general manager, Ransom County Implement, Lisoon, N.D., take different but successful approaches to winter work. See story on Page 6.

White Tractor Line Acquired By AGCO

By SCOTT NESBITT

IN A further shuffle of the North American agricultural machinery business, Allied Products Corp. has agreed to sell the tractor business, and only the tractor business, of its White-New Idea subsidiary to Allis-Gleaner Corp. (AGCO), parent of the Deutz-Allis farm machinery line.

Allied President and Chief Executive Officer Richard A. Drexler said sales of about $240 million are expected in 1991 from Allied's remaining agricultural operations, which will include New Idea products, the White planter and tillage tools, and Bush Hog and Kewanee shortline products.

Terms of the White tractor sale were not disclosed.

White-New Idea had been building the higher-horsepower tractor models sold in the Deutz-Allis lineup.

Robert J. Ratliff, Deutz-Allis president and chief executive officer, said his company also bought all dealer contracts, ''along with all rights and obligations of the contracts.''

Dealers for the 2 tractor lines will find some changes in operations, assuming the sale is agreed to by lenders who have given Allied Products a July 22 deadline to restructure the firm's credit and debt.

Allied had previously sold its White credit subsidiary and its South Bend (Ind.) stamping division, 1 of several subsidiaries in

(See WHITE, pg. 2)

Fiat's FNH Buyout Forms N.H. Geotech

By SCOTT NESBITT

FIAT GROUP of Italy announced on May 7 it had created a new holding company, N.H. Geotech n.v., to run the worldwide agricultural machinery operation business created with Fiat's acquisition of Ford New Holland.

Fiat, of Turin, Italy, will own 80 percent of N.H. Geotech, while Ford Motor Co., of Dearborn, Mich., will own 20 percent. The 2 firms had started the buyout process in December, 1990. The final block to the deal was U.S. Justice Department concern over possible concentration of power in the hay machinery business. That obstacle fell when Allis-Gleaner Corp. bought Fiat's interest in Hesston Corp., which competed with FNH products in the hay machinery market.

N.H. Geotech n.v. was incorporated in The Netherlands, but the headquarters office will be in London, England. The new firm will become 1 of the top 3 agricultural machinery concerns in the non-Communist world, competing with

(See FIAT, pg. 5)

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IMPLEMENT & TRACTOR

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ISSN 0019-2953-$2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined June/July, November/December issues, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

EDITOR'S NOTEBOOK

Why Don't They Count Our Tractors?

BY SCOTT NESBITT

HOW MANY tractors are built each year in the United States?

How often do farmers change the oil in their tractors and combines? What about oil filters, and air filters? And how much hydraulic oil do they use? How much hydraulic hose? How many nuts and bolts?

Those questions, and dozens of similar nature, come in each year to the editorial office of *Implement & Tractor*, and have come in since this magazine started about 105 years ago. And to most of them, we have to answer with that most difficult-to-utter phrase: "I don't know."

It's not that I don't want to know. I just haven't figured out how to get the information, and I don't expect it will ever be available through above-board channels. I prefer the above-board route, and frankly can't afford any other.

There are 2 major reasons why we can't give people the information they want about the farm machinery business, even though *I&T* has been around for more than a century and ought to know such things.

The first is that tractors and combines don't bear license plates in the United States. And there are no titles of ownership. That means there is no governmental "paper trail" other than the papers filed when someone takes a loan for a machine, and that doesn't include all machines, so it's not accurate.

This is in sharp contrast to the passenger car and truck business. The Motor Equipment Manufacturers Association and the manufacturers, both domestic and overseas, release copious amounts of data on their production and sales. This is needed because of import regulations, "gas guzzler" taxes, pollution control laws, etc., etc.

Non-licensing harkens back to an era when farmers controlled state legislatures. Another remnant of that farm-power era is that 14-year-olds can legally operate cars and trucks on public roads, presumably to help with planting and harvest.

The second reason is much more complex, and requires a simplified overview of a few thousand years worth of history.

When this continent was first settled, most farmers lived in houses that were on their farm. That arrangement made sense here in the New World, where there was a lot of land and very few people.

In Europe, way back when (like before writing was invented), people lived in villages with walls, for security. Serfs tilled the soil, but it was owned by lords, who didn't want squatters. Farm workers went out to their fields by day to tend their crops, then headed back to town before dark.

In the modern era, with owner-operator farmers, Europe has retained its village structure. Good farm ground is devoted to crops, and houses are clustered in villages situated on ground where crops won't thrive. An altogether sensible system.

Tractors got really popular over there after World War I. Because so many farmers and farm animals were killed in the fighting, mechanical power had to take up the work.

The farm fields and villages stayed where they were, of course, so that meant a lot of people ended up driving their tractors from the village to the farm for the day's work. That's why European-designed tractors tended to have longer wheel bases (for more comfortable ride) and higher road speeds than North American tractors.

That's also why Ford made so many of its early Fordson tractors in the United Kingdom after World War I. The factory was a lot closer to the market.

A second big war shook Europe and Asia, and that further cut the labor pool and forced more mechanization on farms. After that war, stability and prosperity boosted populations. Eating habits changed, with more meat and dairy products in the diet, just like Americans. Demand for grain increased, both for bread and pasta and as animal food. The tractor market boomed.

As North Americans became more European in their need for mobility on the roads, the Europeans were pulling out of the damage of the Second World War and generally avoiding conflict and becoming prosperous to the point where a farmer could leave the tractor on the farm and drive his BMW, Peugot, Jaguar or Alfa Romeo from his home in the village to work in the fields. So the demands on European tractors got more like those of U.S. tractor.

While these changes were going on, South America was getting to be a bigger part of the world market, thanks to a U.S. president who did some stuff with grain embargoes and Olympic games.

Demand for modern tractors grew in South America, because a new world grain market was created, and the buyers didn't care where it came from. Australia got into the act, too. Some Middle Eastern governments diverted some oil profits into making their deserts bloom, and needed tractors to do it.

The Japanese and other Asians also used tractors in a sort of European way, but they tended to make them even smaller, and adapted to slogging through rice paddies. They served as great chore tractors in other lands.

Some governments, notably in South America, also decided they could demand that things sold in their country be made in their country. Tractor builders put factories in different countries, to keep the locals happy.

Meanwhile, tractors started seriously cruising U.S. highways during the last decade, because many family farms were sold off and the remaining farmers found themselves moving between disconnected fields, often miles apart. They mimicked the European farming system.

Technology enters the picture. The weirdly American use of gasoline as a farm fuel faded. Diesel became dominant, as it was in the rest of the world. Front wheel assist systems on tractors became vogue in the damp climates of Europe and the rice paddies of Asia, and proved to be useful in North America. Monster 4-wheel-drive tractors from the Great Plains started making sense in some other parts of the world, like South America, Australia and the Middle East.

The end result of all these changes was development of "world" tractors. Change the dashboard decals to compensate for a different language. Use metric dimensions on the gauges, along with the English-system markings. Add enough doors and roof openings and bracing to the cabs to meet the safety and noise laws of every nation on Earth.

Then, find the production site that makes the most economic sense in terms of labor skill levels and availability, wage rates, government incentives, and the other factors that go into making any product. Build engines on 1 continent, axles on another, cabs on a third and assemble it all on a fourth...and you have a modern tractor.

Who's to say how you figure out "production" data for an individual nation? What part of stew is the potato, and what part is the pea? Do you figure it by weight or volume or contribution to the goodness of the whole

(See NOTEBOOK, pg. 24)

INDUSTRY UPDATE

Case Simplifies World Structure

RESPONDING to market slumps and a perceived need for more efficiency, the J I Case division of Tenneco has restructured its worldwide operation and shuffled some top management.

"The company recognizes that we are in some very difficult times in terms of the markets we serve," said a Case spokesman. "This structure will save money, make us more efficient and bring a better focus, particularly to our European operation."

The new structure gives the company 4 major units to handle business around the globe. Case sales in 1990 were about $5.4 billion.

In North America, Case will retain a management distinction between agricultural and construction equipment, but will combine those market thrusts in Europe and the rest of the world. Functions of the former Parts and Components Group will be parceled out to other units.

Case will create an Agricultural Equipment and Components business unit for North America, headed by general manager Gary L. Tessitore, who was general manager of the former Agricultural Equipment Group.

Also serving North America will be the new Construction Equipment and Parts unit, headed by Richard L. Wambold, formerly head of the International Business Group.

The North American units will handle the engineering and management for their respective product lines.

Richard W. Krant, general manager of the now-defunct Parts and Components Group, will become managing director of Case Europe, a new unit responsible for ag, construction and parts, handling all marketing, sales, manufacturing, purchasing, parts distribution and credit functions in Europe, where the company has 12 manufacturing plants and foundries and a substantial market share.

Responsibility for the world outside of North American and Europe will fall to Vickey L. Rickey, former marketing vice president in the agricultural equipment group, who will take the title of senior vice president of the International Business Group. □

Canadian Market: Gloomy Report

APRIL sales figures north of the border were no better than elsewhere on the continent, with the Canadian Farm & Industrial Equipment Institute reporting downturns in all sales categories except for shear bar forage harvesters. □

Canada Report Retail Sales In Units

EQUIPMENT	April 1991	April 1990	% Chg.	April/Ytd 1991	April/Ytd 1990	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	267	363	-26.4%	635	983	-35.4%
2WD 40-00 H.P.	694	726	-4.4%	1,703	2,066	-17.6%
2WD 100 H.P. & Over	244	359	-32.0%	688	927	-25.8%
Total 2WD	**1,205**	**1,448**	**-16.8%**	**3,026**	**3,976**	**-23.9%**
Total 4WD	**178**	**182**	**-2.2%**	**380**	**578**	**-34.3%**
TOTAL FARM WHEEL TRACTORS:	**1,383**	**1,630**	**-15.2%**	**3,406**	**4,554**	**-25.2%**
COMBINES						
Self Propelled	45	64	-29.7%	156	217	-28.1%
Pull Type	1	7	-85.7%	6	22	-72.7%
BALERS						
Rectangular Balers	30	75	-60.0%	108	186	-41.9%
Round Balers	136	288	-52.8%	371	572	-35.1%
SWATHERS						
Self Propelled	16	29	-44.8%	36	86	-58.1%
Pull Type	10	12	-16.7%	36	61	-41.0%
FORAGE HARVESTERS						
Shear Bar Type	39	25	56.0%	94	76	23.7%
MOWER CONDITIONERS	**149**	**166**	**-10.2%**	**387**	**397**	**-2.5%**

EMI Flash Report

Nosedive Continues

SALES continued a double-digit nosedive in the agricultural machinery market in April, according to the flash report of the Equipment Manufacturers Institute. For the first 4 months of the year, the only glimmer of hope was in the mere 2 percent drop in combine sales during the traditional off-season for harvesting equipment sales. Field inventories remained bloated. □

U.S. - UNIT RETAIL SALES

Equipment	April 1991	April 1990	April % Change	January-April 1991	January-April 1990	January-April % Change	March 1991 Inventory N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	4,462	5,559	(19.7)	10,560	13,827	(23.6)	41,983
40 & Under 100 HP	3,468	4,678	(25.9)	10,641	12,879	(17.4)	25,949
100 HP & Over	2,310	2,846	(18.9)	7,941	8,872	(10.5)	13,515
Total 2-Wheel Drive	10,240	13,085	(21.7)	29,142	35,578	(18.1)	81,447
Total 4-Wheel Drive	570	684	(16.7)	1,346	1,815	(25.8)	2,876
Total Farm Wheel Tractors	10,810	13,769	(21.5)	30,488	37,393	(18.5)	84,323
Combines: (Self-Propelled)	654	754	(13.3)	2,308	2,356	(2.0)	6,030

Lawn & Garden Product Sales Lumpy

While retail sales in the lawn and garden products and services market grew at an average annual rate of 7 percent from 1985 to 1990, the market has been anything but steady, notes a report from a research firm.

Retail sales were about $15.9 billion in 1990, showing growth of 6 percent. That came after 5 percent growth in 1989. But growth was only 1 percent in 1988, after hovering around 10 percent in 1987 and 1986.

The firm notes the strong linkage between housing starts and sales in lawn and garden products and services, which are seen as an early casualty when disposable income shrinks due to recession.

Further analysis of the market is available in a 200-plus page report priced at $1,750 from Packaged Facts, 581 Avenue of the Americas, New York, NY 10011. □

Deere Makes Money In Second Quarter

Deere & Co. reported net income of $73.1 million (96 cents a share) for the second quarter of 1991 ending April 30. That was down from record net income of $144 million in the same quarter of 1990.

The company said worldwide production was down 14 percent and net sales and revenues were down 9 percent to $1.925 billion in the second quarter of this year, compared to $2.118 billion in the second quarter of last year.

"Our production was lower in response to lower retail demand and to facilitate our planned reduction of company and dealers' inventories during the year," said Hans W. Becherer, chairman and chief executive officer. "Dealer and company-owned inventories normally increase seasonally during the first 6 months of the year. However, the seasonal buildup this year has been much less than during the first half of last year because of the lower production. Additionally, the company's North American dealers' inventories of large tractors and combines, as a percentage of the last 12 months' retail sales, are significantly lower than the rest of the industry."

He said Deere's retail sales in the first 2 quarters of 1991 were higher than in 1990 in agricultural equipment, but sales were down for industrial and lawn-and-garden equipment." □

Ag-Chem Equipment Plans Expansion

Ag-Chem Equipment Co., Inc., has announced it has entered into an agreement to purchase property (subject to an environmental study) in Southaven, Mississippi for a new Action Center. The site is 7 miles southwest of the Memphis International Airport.

Construction of the 12,000 square foot Parts and Service Center will begin this summer, and it is expected that occupancy will take place this fall. The company currently has 12 company-managed centers across the country. □

Gehl Sees Results Slump

Gehl Co. reported sales for the first quarter of 1991 were $29.8 million, down 24 percent from $39.4 million in the first quarter of 1990. Agricultural division sales were

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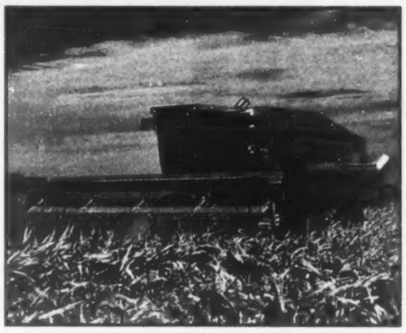
Crop Harvesting And Handling Emphasis

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry



VOLUME 106, NO. 7 AUGUST 1991

Industry Veteran

Carlson New Case President

TENNECO Inc., has announced that Robert J. Carlson has been named president and chief executive officer of its J I Case agricultural and construction equipment unit and is to be elected to the Tenneco Inc., board of directors.

Carlson, 61, began his professional career at Deere & Company, where he spent 29 years, serving last as a senior vice president and member of the board of directors. In 1979 he joined United Technologies Corporation, where he became president and a member of the board of directors.

From 1985 until his recent departure, he was chairman and chief executive officer of BMC Industries, Inc., a manufacturer of electronic and optical products based in Minneapolis.

''Bob Carlson is a seasoned industrial leader with lifelong experience and understanding of industry, particularly the agricultural and construction equipment business—the customers, dealers, products and the challenges,'' said J.L. Ketelsen, Tenneco chairman and chief executive officer. ''He's a strong, no-nonsense executive, and we look to him to continue to build Case as a worldwide competitor. We're glad to have him.''

''I took this job because I am personally convinced that Case has the people and the products in place to

(See CARLSON, pg. 22)

AN INNOVATIVE British-made stripper-header is helping speed harvests in rice and small grains, and generating some sales for dealers. Story on Pg. 6.

New Efforts Spotlighted By AGCO

By SCOTT NESBITT

ARMED WITH orders for 1,000 of their new orange AGCO-Allis tractors, officials of Allis-Gleaner Corp. are feeling optimistic about the future of the new farm machinery conglomerate they are putting together.

''Beside writing orders for 1,000 tractors, we took orders for 125 of the new series of Gleaner combines, and we have cards from 450 dealers who say they'd like to talk about taking on companion lines in the AGCO group,'' said Susan Hogan,

(See AGCO, pg. 3)

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

AUGUST 1991
VOL. 106, NO. 7

IMPLEMENT & TRACTOR
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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years —$30. Single copies, $2.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953-$2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined June/July, November/December issues, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

ROBERT RATLIFF is heading a major integration of lines under the AGCO banner, with a new supplier for the Deutz-Allis tractor line; redesigned Gleaner combines; the acquisition of White tractor production and dealerships; and the takeover of the Hesston product line and half-ownership of the plant that builds hay tools for Tenneco's Case-International dealers.

AGCO—

(From pg. 1)

vice president of communications for the corporation.

Hogan was a major producer of weeks of meetings near Independence, Mo., in June at which AGCO executives introduced themselves and various new, updated and old product lines to dealers of the Deutz-Allis and Hesston product lines and the White tractor lines.

After a series of hectic months in which AGCO chief Robert J. Ratliff seemed to be on an endless buying spree, Hogan reported at the end of July that there had been no new purchases recently, and no decisions made yet on where the company will move production of White tractors (and the 9100 series of large Deutz-Allis models), which are to be built at White-New Idea's Coldwater, Ohio, plant until the end of August.

"He's probably buying something, but I don't know about it because he's on vacation," she said. "Things are settling down here a little bit, but they're heating up as far as putting plans into action. The next big item will probably be the decision on where we put tractor production, but there's no real rush on that."

Ratliff used the "Partners for Tomorrow" meetings with dealers to outline the AGCO game plan and show off the extensive new tractor lineup built in Italy to AGCO specifications by Europe's SLH consortium, formed by SAME and Lamborghini of Italy and Hurlimann of Switzerland.

The new tractors, rated from 40 to 130 pto horsepower, use direct air-cooled engines, the Deutz-Allis lineup will also include 6 DX models of green-painted air-cooled KHD tractors, rated from 51 to 120 pto hp and bearing the Deutz-Allis nameplate.

Air-cooled engines, built in Germany by KHD-Deutz, are used in the Gleaner combines, built in Independence, Mo., and in the orange-painted 9100 series of tractors built to Deutz-Allis specifications at the White-New Idea tractor operation. The 9100 series includes 4 models rated at 135 to 193 pto hp.

White tractor dealers, the latest AGCO acquisition, will continue with water-cooled tractors in the America series, (2 models of 61 and 81 pto hp) and the Workhorse series (4 models of 125 to 195 pto hp). Hesston hay equipment was to re-

(See AGCO, pg. 12)

AGCO ALLIS
COMPETITIVE PRICE

BRIGHT ORANGE colors like the old Allis-Chalmers products and a large new identifying badge as an AGCO tractor are among outward visual symbols of the changes taking place in the Deutz-Allis system.

INDUSTRY UPDATE

Snow Thrower Shipments Decline

The OPEI estimate for snow thrower shipments in model year 1991 (March 1, 1990-February 28, 1991) indicates a decrease of 20 percent.

U.S. manufacturers, both OPEI members and non-members, shipped 285,000 single and two stage units in comparison to the 1990 model year shipments of 355,000 units.

Continued below normal snow fall was a major contributor to this reduction in shipments as well as inventory reductions at the retail level. ☐

GT Mfg. Formed After Purchase

The assets of the former bankrupt GT, Inc. Company have been purchased by the owners of Grain Belt Supply Company, Inc. of Salina, Kan., a manufacturing company in the agriculture industry for the past 40 years. From this, a new company, GT Mfg., Inc., has been formed and began operation on June 3.

GT Mfg., Inc. has retained all key personnel, and will continue producing its grain dryer, no-till drill, and grain cleaner lines. New ownership and management will aggressively pursue new pricing and policies that will allow GT Mfg., Inc. to better serve their customers. ☐

Video Developed To Prevent Tractor Accidents

California Polytechnic State University, in association with The Zenith Insurance Company, has developed a new 24-minute videotape to train tractor operators to prevent tractor accidents. This video is titled *Tractor Accidents: It's not Gonna Happen To Me.*

The program starts with a segment on "pre-operation check", directing the viewer to inspect such items as the spinner shield, shaft, tires, oil and fuel shut-off cable before operation. Each following segment covers its topic in a similarly comprehensive manner. Additional topics include "transporting tractor", operation check", "tractor behavior and accident prevention", and "emergency response procedures".

The video uses dramatization and computer animation to demonstrate how accidents happen and emphasize ways to avoid them. It utilizes a blend of entertainment value to make it enjoyable as well as educational.

Tractor Accidents: It's Not Gonna Happen To Me should be viewed by tractor operators in any farm or ranch operation, landscape companies using tractors, agriculture students, and anyone with agricultural safety training responsibilities. It is available in Spanish and English. VHS copies may be ordered for $95.00 plus $7.60 shipping and handling from Vocational Education Productions, California Polytechnic State University, San Luis Obispo, CA 93407. California residents must include 6 percent sales tax. For further information call 1-800-235-4146. ☐

Blount Reports $3 Million Loss

Blount, Inc. has reported financial results for the first quarter ended May 31. Sales and revenues, affected by the continuing recession, were $136.7 million compared to $170.8 million for last year. Operating income was $2.7 million compared to $6.7 million last year. Net loss was $3.0 million ($.25 per share) compared to net income of $1.2 million ($.10 per share) in last year's first quarter.

R. William Van Sant, president and chief executive officer of Blount, Inc. said, "The company's first quarter performance is essentially in line with our plan. We anticipated the results given the prolonged recession and its effects on our markets. Also, the cyclical nature of our businesses usually impacts first quarter performance."

The Outdoor Products group reported improved performance, aided by increased demand for its lawn

Canadian Market: June Up, Year Down

ALTHOUGH YEAR-TO-DATE figures remain discouraging, some positives were reported by the Canadian Farm & Industrial Institute in its June report. Total farm wheel tractor sales, with the exception of 2-wheel drive units under 40 hp, increased during the month. Self propelled combines have recovered significantly while pull type combine sales remain off. Baler and mower conditioner sales improved during June. Forage harvesters and swathers struggled. ☐

Canada Report Retail Sales In Units

EQUIPMENT	1991	June 1990	% Chg.	1991	June/Ytd 1990	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	351	474	-25.9%	1,381	1,946	-29.0%
2WD 40-99 H.P.	718	655	9.6%	3,042	3,519	-13.6%
2WD 100 H.P. & Over	326	178	83.1%	1,390	1,484	-6.3%
Total 2WD	**1,395**	**1,307**	**6.7%**	**5,813**	**6,949**	**-16.3%**
Total 4WD	**174**	**124**	**40.3%**	**844**	**948**	**-11.0%**
TOTAL FARM WHEEL TRACTORS:	**1,569**	**1,431**	**9.6%**	**6,657**	**7,897**	**-15.7%**
COMBINES						
Self Propelled	161	91	76.9%	488	367	33.0%
Pull Type	11	17	-35.3%	20	46	-56.5%
BALERS						
Rectangular Balers	187	161	16.1%	351	470	-25.3%
Round Balers	620	535	15.9%	1,193	1,364	-12.5%
SWATHERS						
Self Propelled	63	77	-18.2%	137	192	-28.6%
Pull Type	39	67	-41.8%	92	136	-32.4%
FORAGE HARVESTERS						
Shear Bar Type	87	103	-15.5%	218	221	1.4%
MOWER CONDITIONERS	758	689	10.0%	1,329	1,376	3.4%

EMI Flash Report

News Good, Bad

After a slight recovery in some sectors of May, farm wheel tractor sales in June slipped back into the doldrums in June, losing ground in the below 100 hp, as well as in the total 2-wheel drive and total 4-wheel drive categories, for both the month and year-to-date. Above 100 hp tractor sales climbed for the second straight month, however. Combine sales improved significantly in May and June, according to the flash report of the Equipment Manufacturers Institute. ☐

U.S. - UNIT RETAIL SALES

Equipment	May 1991	May 1990	May % Change	January-May 1991	January-May 1990	January-May % Change	April 1991 Inventory N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	5,001	5,412	(7.6)	15,558	19,239	(19.1)	40,539
40 & Under 100 HP	4,172	4,015	3.9	14,816	16,894	(12.3)	26,099
100 HP & Over	1,999	1,665	20.1	9,941	10,537	(5.7)	12,879
Total 2-Wheel Drive	**11,172**	**11,092**	**.7**	**40,315**	**46,670**	**(13.6)**	**79,517**
Total 4-Wheel Drive	**610**	**469**	**30.1**	**1,920**	**2,284**	**(15.9)**	**2,736**
Total Farm Wheel Tractors	**11,782**	**11,561**	**1.9**	**42,235**	**48,954**	**(13.7)**	**82,253**
Combines: (Self-Propelled)	1,308	811	61.3	3,606	3,167	13.9	6,023

U.S. - UNIT RETAIL SALES

Equipment	June 1991	June 1990	June % Change	January-June 1991	January-June 1990	January-June % Change	May 1991 Inventory N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	4,862	5,577	(12.8)	20,456	24,816	(17.6)	37,851
40 & Under 100 HP	4,238	4,552	(6.9)	19,042	21,446	(11.2)	24,722
100 HP & Over	1,924	1,294	48.7	11,865	11,831	.3	12,481
Total 2-Wheel Drive	**11,024**	**11,423**	**(3.5)**	**51,363**	**58,093**	**(11.6)**	**75,054**
Total 4-Wheel Drive	**463**	**467**	**(.9)**	**2,239**	**2,751**	**(18.6)**	**2,716**
Total Farm Wheel Tractors	**11,487**	**11,890**	**(3.4)**	**53,602**	**60,844**	**(11.9)**	**77,770**
Combines: (Self-Propelled)	1,165	951	22.5	4,771	4,118	15.9	5,499

These data are, in part, estimates which are subject to revisions when final detail data become available. Because of the seasonal nature of the industry comparisons of monthly data from one period to another should be done with extreme caution. These data represent most, but not all, of the manufacturers in each product category being sold at retail in the fifty states and the District of Columbia.

Directions In Marketing...Service/Parts Update

IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

VOLUME 106, NO. 8

SEPTEMBER 1991

DEALERS SHOWED UP to celebrate and went home with party favors—spray rigs at special low prices—during Hardi International's dedication of a new facility at Davenport, Iowa. The marketing approach is one of two highlighted in articles beginning on Pages 12 and 13.

Walsh Selected To Lead Tenneco

By SCOTT NESBITT

A RAILROAD operator and former Cummins Engine executive has been selected to succeed James L. Ketelsen as leader of Tenneco, Inc., owners of J I Case agricultural and construction machinery operation.

Michael H. Walsh, 49, will become president of Tenneco on October 1, and also join the board of directors at that time. He had been chairman and chief executive officer of the Union Pacific Railroad since 1986. Prior to that, he held various positions with Cummins, including executive vice president and general manager of worldwide operations.

On January 1, 1992, Walsh is to assume the title of chief executive officer.

On May 12, 1992, at Tenneco's annual shareholder's meeting, Walsh is to take over the title of chairman of the board, upon retirement of Ketelsen, 60, who was president of Case before rising to the helm of Tenneco in 1978.

Ketelsen was a key player in Case's 1984 acquisition of International Harvester's agricultural machinery division, and has reportedly maintained a strong role in running Case-International. Most recently, insiders say he had been calling the shots while seeking a replacement for James K. Ashford, who resigned the Case presidency for unspecified "personal reasons."

The replacement for Ashford, named in July, is Robert J. Carlson, 61, who spent 29 years at Deere & Co. before leaving in 1979 to become president of United Technologies Corp. He served UT until 1985,

(See WALSH, pg. 17)

Michael H. Walsh

Deere Nets $31.3 Million In 3rd Quarter

DEERE & Co. reported net income of $31.3 million for the third quarter of the company's 1991 fiscal year. While the machinery side of the business showed a loss, financial services lifted the company out of the red.

The earnings, at 41 cents a share, were well below the net income of $144.1 million, or $1.50 a share, reported for the same quarter in 1990.

Worldwide net sales and revenues

(See DEERE, pg. 4)

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IMPLEMENT & TRACTOR

The Business Magazine of the Agricultural, Industrial & Outdoor Power Equipment Industry

SEPTEMBER 1991
VOL. 106, NO. 8

IMPLEMENT & TRACTOR
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Subscription Information: Implement & Tractor is edited for persons in the farm and industrial equipment industry who function in the areas of retail sales and service, distribution sales and service, marketing, engineering, financing, manufacturing and general management. Subscription prices: U.S. and Canada one year — $15, three years —$30. Single copies, $2.50, except Annual Statistical Number, $4; Product File issue, $8; Red Book issue, $8. Extra charge for service on back issues. Allow 6-8 weeks for change of address and new subscriptions. Foreign subscriptions: Air Mail only available. One year — $100; three years — $250 (U.S. currency).

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ISSN 0019-2953-$2.50 + 0.00

IMPLEMENT & TRACTOR (USPS 461-750, ISSN-0019-2953) is published monthly, except combined June/July, November/December issues, by Farm Press Publications, P.O. Box 1420, Clarksdale, Miss. 38614. Second class postage paid at Clarksdale, Miss., and additional mailing offices. POSTMASTER: Send Form 3579 to P.O. Box 1420, Clarksdale, Miss. 38614.

Farm Press Publications
A Division of Argus Press Holdings, Inc.

EDITOR'S NOTEBOOK

Who's Big Enough To Buy Case?

By SCOTT NESBITT

NO ONE has put it on the market, yet.

But inevitably the question will arise: Is anyone big enough to buy JI Case?

It's a very premature question, but it's been triggered by some rapid changes in top executives, heavy losses and restructuring at the nation's Number 2 farm and construction machinery builder.

Back in April, James K. Ashford severed his ties with Tenneco. He quit as Case's president, as a Tenneco executive vice president, and as a director. He had been with Tenneco since 1958, and was credited with putting Case's results into the black after 3 years of his administration.

His record was no doubt helped by the fact that the ag and construction industries were having some decent years. The only reason Ashford gave publicly for quitting was ''personal reasons.''

A few weeks after he quit, the JI Case division of Tenneco reported a first-quarter loss of $147 million.

His boss, James L. Ketelsen, was quoted saying when Ashford quit ''I understand his reasons and wish him well.''

Rumbles in the industry have it that Ashford and his advisers realized, about the time of The Gulf Showdown (it seems wrong to call it a war) that both ag and construction machinery sales were going to slump, and wanted to cut back production.

There are reports of hurried plane flights between Racine and Houston, and the maximum leader's final word coming down...keep the plants running.

The briefest glance at farm tractor inventory figures supplied by the Equipment Manufacturers Institute reveals there were many too many tractors on dealers' lots this year. A lot of that glut could be traced to the number 2 tractor maker pumping product into a market short of buyers.

Deep discounting became the rule on the market this year. Great deals on red tractors. Prices got better on green tractors. Lighter green tractors turned orange, and got cheaper. Silver tractors were bought by the orange tractors. The other red tractors muddled along. Blue tractors were bought by the primer-red tractors. Various brands of imported tractors sold under varying brand names continued eating some share of the market. Farmers and construction types once again were taught that if you wait long enough, tractor prices will go down. Way down.

Didn't something like that happen before Ashford became president of Case, when there were too many tractors and lots of panic selling? Wasn't there a different president at Case at the time, who'd also done a pretty good job? Doesn't history repeat itself?

Finally: Is anyone big enough to buy Case?

Tenneco hasn't put the division on the market. But a $123 million second-quarter loss, added to the first-quarter loss, makes a loss for this year of $270 million for JI Case.

If you lost more than a quarter-billion dollars on something in half a year, would you want to get rid of it. Without a former tractor company president leading the operation, will the Tenneco board want to hang on in agriculture, with all its ups and downs and slim profits even in the best of times?

No one is formally making a connection, but [illegible] hard to mistake the coincidence of timing between that second-quarter loss and the announcement that Ketelsen, a vigorous 60-year-old, was going to retire as maximum boss. He'd led Tenneco since 1978, holding simultaneously the jobs of president, chairman of the board and chief executive.

At least the official announcement of Ketelsen's plan to retire didn't use the phrase ''personal reasons.''

Ketelsen's replacement is to be Michael H. Walsh, who is widely credited with knowing how to run a railroad, after having some success turning a profit (and trimming lots of fat and old ways of doing things) at the Union Pacific Railroad.

Business analysts look at Tenneco overall and see assets of $19 billion and debts of $9 billion. No one knows how much of that debt Tenneco would like to pay off with revenue for the sale of Case, if they sold the division.

The Case division has not been wildly profitable. In 1989, Case sold $5 billion worth of goods and had income of $228 million before interest and federal taxes (and the interest must have taken a good chunk of that income.) In 1990, the company sold a little bit more, recording sales of $5.4 billion, but managed to make less, reporting income of $186 million.

In the 1990 annual report, some of that downturn was attributed to ''the cost of actions taken in 1990 to improve long-term profitability.''

The first-half 1991 results indicate those actions didn't get the job done?

It's interesting to speculate, this early in the game, on what the final outcome might be if Tenneco decides to get rid of Case.

Deere couldn't get government approval to take over Canada's Versatile, so there's little chance they would get approval to take over Case.

Likewise for Fiat/Ford New Holland. The Italians are still digesting that meal. Caterpillar has been pushing back into the agricultural sphere with its rubber belted tractors, but really doesn't have the distribution system to blanket the rural areas where ag machinery buyers live. Maybe a blended paint job of yellow and red would produce a nice orange color for a Cat-Case-IH lineup.

Komatsu, the big Japanese builder of construction machinery, reputedly would not mind having the Case world construction distribution system. Given the dollar-yen imbalance, they might be able to make payments out of pocket change.

Allis-Gleaner Corp. (a.k.a. Deutz-Allis) has been on a buying spree of late. AGCO boss Bob Ratliff showed his willingness to take on liabilities along with assets in his acquisition of the White tractor line.

Kubota might have the financial backing, and has certainly demonstrated the ability to make a profit

(See NOTEBOOK, pg. 19)

INDUSTRY UPDATE

DEERE PROFITS—

(From pg. 1)

for the quarter were $1.79 billion, down 13 percent this year compared to 1990, and total worldwide production was down 19 percent compared to the previous year's third quarter.

Worldwide equipment operations had net income of about $1 million in the third quarter this year, but had shown a loss of $28.3 million for the first 3 quarters. In the same 1990 period, those operations showed a net income of $244 million.

Given the reported loss of $270 million for the first half of the year by Deere's chief domestic rival, the J I Case division of Tenneco, the report was better than might have been expected.

Deere said results for the first nine fiscal months (ending July 31) compared to the same period in 1990 were:

Net sales of $5.153 billion, down 11 percent from $5.811 billion;

Net income of $61.3 million, (80 cents a share) against $336.6 million, ($4.44 a share);

Net sales of equipment $4.264, down 15 percent from $5.008 billion;

Financial services revenues of $797 million, up 11 percent from $715 million.

''Retail sales of John Deere agricultural equipment in North America declined in the third quarter of 1991 compared with the same period last year. Sales were slightly higher for the first 9 months of this year,'' although slightly lower overseas, particularly in Europe, according to Hans Becherer, chairman and chief executive officer.

He said North American sales in construction and consumer products were also down due to recession and dry weather.

''The outlook for North American agriculture for the remainder of this fiscal year and into early 1992 has become somewhat less favorable and we expect farmers to remain cautious in making new product purchase decisions,'' Becherer said.

Looking through the end of the fiscal year, he said worldwide production tonnage is now expected to be 10 percent lower than actual 1990 output, and projected a ''significant decline'' during the fourth quarter, compared to last year, given ''lower volumes and strong price competition'' in machinery markets. ☐

Deere, Union Start Talks

Facing an Oct. 1, 1991, deadline for their current contract, Deere & Co. and the United Auto Workers union opened talks August 15 on a new contract to cover about 12,400 employees. ☐

EMI Flash Report

Sales Stabilizing?

JULY SALES of farm wheel tractors come close to the pace of July 1990, perhaps signalling an end to the long industry nosedive started last fall. Sales in May were slightly ahead of the 1990 pace, while June had slipped below last year's mark. But the Equipment Manufacturers Institute flash report still showed serious weakness in 4-wheel-drive tractors. Combine sales, after topping the 1990 pace for in May and June, dropped off sharply in July. Inventory figures showed a general overload of equipment, particularly combines. ☐

U.S. - UNIT RETAIL SALES

	July			January-July			June 1991 Inventory
Equipment	1991	1990	% Change	1991	1990	% Change	N.A. Factory & U.S. Field
Farm Wheel Tractors:							
2-Wheel Drive							
Under 40 HP	3,904	3,830	1.9	24,489	28,646	(14.5)	35,672
40 & Under 100 HP	3,082	3,106	(.8)	22,034	24,552	(10.3)	23,829
100 HP & Over	933	886	5.3	12,773	12,717	.4	12,491
Total 2-Wheel Drive	**7,919**	**7,822**	**1.2**	**59,296**	**65,915**	**(10.0)**	**71,992**
Total 4-Wheel Drive	**212**	**301**	**(29.6)**	**2,390**	**3,052**	**(21.7)**	**2,646**
Total Farm Wheel Tractors	**8,131**	**8,123**	**.1**	**61,686**	**68,967**	**(10.6)**	**74,638**
Combines:							
(Self-Propelled)	534	975	(45.2)	5,304	5,093	4.1	5,156

These data are, in part, estimates which are subject to revisions when final detail data become available. Because of the seasonal nature of the industry comparisons of monthly data from one period to another should be done with extreme caution. These data represent most, but not all, of the manufacturers in each product category being sold at retail in the fifty states and the District of Columbia.

Outdoor Power Forecast:

Down In '91, Upturn In '92

SHIPMENTS for the outdoor power equipment industry are expected to be down from 1990 levels for all categories for the remainder of this year, but to turn upward next year, according to a revised forecast from the Outdoor Power Equipment Institute.

OPEI, whose members make more than 95 percent of U.S. consumer powered lawn and garden maintenance products, issued the revised forecast in late July.

''The surging growth phase usually associated with the end of a recession is not expected to be seen,'' the report said. ''Rather, the economy is expected to show growth rates that are more in line with a mature stage of recovery.'' ☐

Model Year Basis (Sep-Aug)

	ACTUAL							FORECAST	
	1984	1985	1986	1987	1988	1989	1990	1991	1992
UNIT SHIPMENTS									
Walk-Behind Powered Mowers	4,950,000	5,193,000	5,400,000	5,900,000	5,600,000	5,300,000	5,700,000	5,432,131	5,767,031
Percent Change	12.5%	4.9%	4.0%	9.3%	-5.1%	-5.4%	7.5%	-4.7%	6.2%
Rear Engine Riding Mowers	354,000	355,000	322,000	375,000	375,000	260,000	247,000	206,878	214,914
Percent Change	28.3%	0.3%	-9.3%	16.5%	0.0%	-30.7%	-5.0%	-16.2%	3.9%
Front Engine Lawn Tractors	502,000	548,000	623,000	800,000	812,000	792,999	885,000	855,088	941,273
Percent Change	21.0%	9.2%	13.7%	28.4%	1.5%	-2.3%	11.6%	-3.4%	10.1%
Riding Garden Tractors	152,000	147,000	149,000	150,000	170,000	139,000	156,000	126,473	145,911
Percent Change	17.8%	-3.3%	1.4%	0.7%	13.3%	-18.2%	12.2%	-18.9%	15.4%
ALL RIDING UNITS	1,008,000	1,050,000	1,094,000	1,325,000	1,357,000	1,191,999	1,288,000	1,188,440	1,302,098
Percent Change	22.9%	4.2%	4.2%	21.1%	2.4%	-12.2%	8.1%	-7.7%	9.6%
Tillers	399,000	362,000	311,000	272,000	285,000	305,000	300,000	294,402	259,021
Percent Change	-2.2%	-9.3%	-14.1%	-12.5%	4.8%	7.0%	-1.6%	-1.9%	-12.0%

U.S. Technology Featured in Moscow

A trade show slated for October 16 to 23, 1991, will attempt to bolster penetration of the Soviet market by American agricultural machinery firms.

The ''Agrotech '91'' show will be held at Sokolniki Park in Moscow and is to cover all aspects of machinery and equipment in agriculture, processing technology for agricultural chemicals and biotechnology production. Attendees will be buyers and potential joint-venture partners from every region of the USSR. ☐

Mathews Purchases Kan-Sun Dryers

Mathews Company announces the purchase of the Kan-Sun Dryer Product Line from Butler Manufacturing, Kansas City, Missouri. The purchase includes all inventory, tools, prints, fixtures and parts for the Kan-Sun Grain Dryers. Effective immediately, parts for Kan-Sun Dryers will be available from Mathews Company in Crystal Lake, Illinois.

The purchase comes after numerous requests from Kan-Sun dealers and customers for the continuation of the Kan-Sun Dryer. Mathews plans to market the new M-C Kan-Sun Product Line in spring 1992. ☐

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AD-2 SALES MGR...Experience in management, sales and computer. Strong in short line and CASE/IH. $25,000. Midwest. Call Judy at 515-394-3146.

AS-3 SALES/MGMT...Strong exp. in sales with JD dealerships. Likes IA. $50,000+. Call Sherry at 712-779-3677.

AJ-4 SALES MGR...JD Territory manager wants sales, purchasing or product support. Knowledge of John Deere Information System and computer base programs. $45,000. East of the Mississippi. Call Judy at 515-394-3146.

AS-5 MGMT...Own MF dealership with seven employees. Son taking over business. Needs college town. $45,000+ Call Sherry at 712-779-3677.

AJ-6 SERVICE MGR...Case/IH. Proven record for knowledge for 15 + yrs. Interested in advancement with benefits. $26,000. Call Judy at 515-394-3146.

AS-7 SALES/MGMT...Family Ford dealership 12 years. Strong in parts. B.S. Bus. Admin. $20,000+. Call Sherry at 712-779-3677.

AJ-8 PARTS...Counterman, warranty and service experience. Automotive dealership retail and wholesale. Midwest. Call Judy at 515-394-3146.

POSITIONS

AA-1 SALES...Inside and outside sales of full line farm and truck equipment. Ag Sales experience. WI. $25,000+.

AA-2 PARTS...Case IH, Ford/New Holland, Deutz. IL, MN.

AA-3 SERVICE/SHOP MGR...Case IH. VA Coast. $23,000.

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AA-5 MECHANIC...Case/IH dealership needs exp. mechanic. KS. $7-$10/Hr.

AA-6 JD MECHANIC...Top dealership with newer shop. IL. $10-$12/Hr.

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EMPLOYER PAID FEES

Canadian Slump Continues In July

CONTINUING malaise in farming north of the border kept farm machinery sales in a continuing slump, as indicated in the July sales report issued by the Canadian Farm and Industrial Equipment Institute. ☐

Canada Report
Retail Sales In Units

EQUIPMENT	July 1991	July 1990	% Chg.	July/Ytd 1991	July/Ytd 1990	% Chg.
FARM WHEEL TRACTORS						
2WD under 40 H.P.	297	423	-29.8%	1,717	2,369	-27.5%
2WD 40-99 H.P.	462	592	-22.0%	3,452	4,111	-16.0%
2WD 100 H.P. & Over	178	103	72.8%	1,567	1,587	-1.3%
Total 2WD	**937**	**1,118**	**-16.2%**	**6,736**	**8,067**	**-16.5%**
Total 4WD	**87**	**121**	**-28.1%**	**931**	**1,069**	**-12.9%**
TOTAL FARM WHEEL TRACTORS:	**1,024**	**1,239**	**-17.4%**	**7,667**	**9,136**	**-16.1%**
COMBINES						
Self Propelled	134	84	59.5%	622	451	37.9%
Pull Type	19	12	58.3%	39	58	-32.8%
BALERS						
Rectangular Balers	140	296	-52.7%	492	766	-35.8%
Round Balers	935	993	-5.8%	2,129	2,357	-9.7%
SWATHERS						
Self Propelled	148	112	32.1%	283	304	-6.9%
Pull Type	126	279	-54.8%	218	415	-47.5%
FORAGE HARVESTERS						
Shear Bar Type	69	88	-21.6%	287	309	7.1%
MOWER CONDITIONERS	**756**	**850**	**-11.1%**	**2,090**	**2,226**	**-6.1%**

Customer Needs Reflected In Line

DEERE and Company is making a number of "customer driven" changes to its tractor line with a new 60s Series, changes to its existing largest models of 2WD and Caster/Action MFWD tractors and the addition of two new intermediate-size tractors.

Though horsepower ratings remain the same as the 55 Series models they replace, the new John Deere 4560, 4760 and 4960 2WD and MFWD tractors carry several refinements in operator comfort and convenience as well as serviceability, said Jim Wright, manager, tractor marketing at Deere's Waterloo, Ia., factory, during an introduction here.

Features include a wide platform on the left side of the tractors housing both batteries and enhancing ease of entering and exiting the cab. Safety handrails are attached to the 3-stair platform assembly.

For improved visibility, the exhaust stack has been relocated to the right-hand side of the cab. The air-intake stack has been replaced with a design that draws combustion air for the engine through the nose of the tractor for improved air flow and cleared view of the field.

Wright said the new model groupings divide Deere's six "row crop" tractors into two groups: three "smaller-frame" tractors, 105 to 140 pto horsepower, and three "larger frame" models, 155 to 200 pto horsepower.

The tractors feature the same 7.6-liter John Deere diesel, John Deere designed and built transmissions, closed-center hydraulics, planetary final drives, and hydrostatic steering used in the 55 Series models they replace. ☐

Datcon Instrument Company, of East Petersburg, Pennsylvania, has announced a major restructuring and expansion of the Sales/Marketing organization.

Organizational changes include the appointment of **Robert A. Scharnell** as vice president of sales marketing. Rejoining the company is **Robert Purcell** as regional sales manager for the company, operating out of the Ohio area.

Bradley K. Schmoyer, also a regional sales manager with the company, will be relocating from East Petersburg to the Wisconsin area.

Brian White has joined the staff as an outside sales consultant at the company's European sales office in Westbury, England, near London.

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